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THE EXPORT REORGANIZATION ACT—1975

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HEARINGS
BEFORE THE
COMMITTEE ON
GOVERNMENT OPERATIONS
UNITED STATES SENATE
NINETY-FOURTH CONGRESS
FIRST SESSION

APRIL 24, 30, AND MAY 1, 1975

Printed for the use of the Committee on Government Operations

Y4.G74/6:Ex7/975

U.S. GOVERNMENT PRINTING OFFICE
55-430 O WASHINGTON : 1975

For sale by the Superintendent of Documents, U.S. Government Printing Office
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THE EXPORT REORGANIZATION ACT—1975

THURSDAY, APRIL 24, 1975

U.S. SENATE,
COMMITTEE ON GOVERNMENT OPERATIONS,
Washington, D.C.

The committee met, pursuant to notice, at 10 a.m., room 3302, Dirksen Building, Senator Abraham A. Ribicoff, Chairman, presiding.

Present: Senators Ribicoff, Percy, and Glenn.

Staff members present: Dick Wegman, chief counsel and staff director; Paul Leventhal, counsel; Marilyn Harris, chief clerk; and Pat Donat, clerical assistant.

OPENING STATEMENT OF SENATOR PERCY

Chairman RIBICOFF. The committee will come to order.

The main question before us today, as we begin to explore the various controls that the United States places on its peaceful nuclear exports, is whether all the responsible agencies have been working together to ensure that none of these exports can be converted by nations or terrorist groups into atomic weapons.

The bill which Senator Percy, Senator Glenn and I have joined in introducing, S. 1439, the Export Reorganization Act of 1975,[1] would require that all nuclear exports by the United States be made contingent on a finding by the Nuclear Regulatory Commission that safeguards against diversion, theft, and sabotage in recipient countries are substantially comparable to safeguards required by the Commission to obtain a commercial nuclear license in the United States.

No such test to ensure the comparability of international safeguards to our own is being used today. In fact, the Nuclear Regulatory Commission, according to our preliminary committee inquiry, has been excluded from playing any role in a major share of our Nation's nuclear exports, despite the fact that it is designated by the Atomic Energy Act to regulate such exports in the interest of public health and safety, and common defense and security.

Last year, when this committee managed the Energy Reorganization Act, our primary purpose in abolishing the Atomic Energy Commission was to ensure that promotional and regulatory activities with respect to atomic energy would be clearly separated in two new agencies—the Energy Research and Development Administration and the Nuclear Regulatory Commission.

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[1] See appendix p. 499.

Now it appears that ERDA, which has taken over the nuclear promotional functions of the AEC, continues to make the basic regulatory findings and decisions with respect to nuclear exports. NRC now licenses the export of nuclear materials and complete facilities, but it is essentially a rubberstamp operation. NRC has no choice but to rely on ERDA to determine the adequacy of safeguards because the commission has no resources to do the job itself.

Under the Export Reorganization Act, this export safeguard function will be transferred from ERDA to NRC to enable the independent regulatory agency to make the safeguards comparability finding required by the act. NRC now has no voice in exports of nuclear technology, such as blueprints, and of component parts for nuclear facilities, which are handled by ERDA and the Department of Commerce respectively. Under the act, licensing of all types of nuclear exports would be centralized in the Commerce Department, and the certifying of adequate safegards on all nuclear exports would be centralized in the Nuclear Regulatory Commission.

The proposed reorganization of Federal controls over peaceful nuclear exports is crucial because it seeks to reverse the present dangerous proliferation of commercial reactors and materials throughout the world without the strictest possible safeguards to prevent the spread of nuclear weapons.

For years we have been the sole exporter of the enriched uranium needed to fuel the free world's commercial reactors, but we never used this monopoly to insist on strict safeguards to prevent the plutonium byproduct of these reactors from being made into atomic bombs.

We have ratified the Nuclear NonProliferation Treaty, but we continue to sell our nuclear exports to nonNPT countries like India and South Africa which refuse to place all of their nuclear facilities under even the limited safeguards of the International Atomic Energy Agency.

IAEA safeguards are designed only to detect diversion of nuclear materials by nations, not to prevent theft and shortage by terrorist groups. It is questionable whether present IAEA safeguards are adequate to foil a nation that seeks to secretly stockpile plutonium.

The explanation that our Government and our nuclear industry give for continuing to export nuclear reactors under presently inadequate safeguards is that if we do not sell our reactors to nations that want to buy them, other nuclear exporting nations will make the sales—and under safeguards conditions that are less strict than our own.

The terrible irony of all this is that the reactors now being sold by such exporters as France and West Germany in competition with our own reactors are based on designs that American manufacturers originally sold to France and West Germany manufacturers. The exports of this American nuclear technology had been approved by the old Atomic Energy Commission without requiring, as a condition of the sale, that foreign manufacturers impose strict safeguards on their own reactor exports. The result is that we now find ourselves in an increasingly nuclear-powered world that is governed by nationalism and commercialism.

Unless something is done—and done quickly—to reverse this trend, the spread of nuclear weapons and the threat of nuclear blackmail may be irreversible.

Plutonium stolen abroad poses as great a danger to our defense and security, to our health and safety, as plutonium stolen at home. The same holds true for every nation in the world. Therefore, I do not accept the argument that we cannot condition our nuclear sales on strict safeguards because other nuclear exporting nations will not follow our example.

I believe that if the United States exerts world leadership on this momentous issue, other nations will follow. We are still the world leader in nuclear technology; we are still the major supplier of enriched nuclear fuel. Other nations cannot ignore us—yet. But time is running out. In a world of nuclear disorganization, we must begin to act wisely now.

The place to start is at home by imposing tight regulatory controls over our nuclear exports. I believe this bill takes the right approach by making the Nuclear Regulatory Commission the lead agency in this area. Our Government will then be in a position to influence other nuclear exporting nations to do the same and to protect our competitive position in international nuclear trade.

I am pleased to designate Senator Glenn as ad hoc chairman of these hearings. His unique scientific and technical skills are a valuable resource to this committee and the Congress in considering as complex an area as nuclear technology.

Senator Glenn?

OPENING STATEMENT OF SENATOR GLENN

Senator GLENN. It is both a privilege and a challenge to serve as ad hoc chairman of these hearings of the Senate Government Operations Committee on the activities of the executive branch with respect to certain strategically significant exports. The bill we have before us, S. 1439, the Export Reorganization Act of 1975, proposes significant reforms of the present interagency system for controlling these exports both from the standpoint of economy and efficiency in Government and of promoting the vital national interests of the United States.

We open these hearings by reviewing the present system by which the Federal Government controls the export of nuclear technology—including designs, facilities, materials, and component parts—for peaceful purposes. It should be made clear at the outset that our purpose is not to determine whether civilian nuclear exports should be stopped, but rather how they might be better controlled to promote common defense and security and public health and safety.

Last fall, the Secretary of State, in an address to the United Nations General Assembly, acknowledged that the plutonium byproduct of peaceful reactors is also the main ingredient of nuclear explosives, and he warned that the U.S. policy of exporting reactor fuel and other materials "cannot continue if it leads to the proliferation of nuclear explosives."

The Director of the Arms Control and Disarmament Agency, who is our leadoff witness today, has spoken out on the danger that our

Nation's Atoms for Peace program could be the vehicle for proliferating nuclear weapons throughout the world.

The Energy Research and Development Administration, in its interim environmental impact statement on the nuclear export program, described recent efforts to respond to the increase of worldwide terrorist activities by strengthening physical security measures both domestically and internationally.

Next month, a special fifth-anniversary review conference of the Nuclear NonProliferation Treaty nations will convene in Geneva to review the adequacy of present international safeguards against diversion of peaceful nuclear materials by nations for weapons purposes, as well as to explore the need for uniform physical security measures to prevent theft and sabotage by terrorists. At present, the safeguards administered by the International Atomic Energy Agency for the parties to the treaty deal only with national diversion, and it has been questioned whether these safeguards are sufficient to detect the secret stockpiling of plutonium.

Our hearing into the adequacy of Federal nuclear export controls, therefore, come during an important period of reevaluation by our own Government and the international community. The proposed Export Reorganization Act provides an excellent vehicle for defining the objectives of our nuclear export program in relation to a realistic appraisal of present dangers and difficulties.

India's use of imported civilian nuclear materials and technology, apparently from Canada, to carry out a "peaceful" nuclear explosion is an example of the dangers we face. Potentially more significant in terms of proliferation, is the recent announcement by South Africa that it has developed a new, relatively cheap process for enriching natural uranium to the levels of concentration needed to make reactor fuel or nuclear explosives.

Neither India nor South Africa are parties to the Non-Prolofera-tion Treaty, and both have nuclear facilities that are not subject to IAEA safeguards. Nevertheless, the United States has continued to make civilian nuclear exports to these nations. Our nuclear trade with India, South Africa, and other non-NPT nations is an important issue which we will want to explore today.

The purpose of the bill we consider today is to "reorganize certain export functions of the Federal Government to promote more efficient administration of such functions".

More specifically, it is the intent of the Act:

To reorganize and centralize certain export licensing functions of the Government in a single agency to which all persons and commercial interests seeking to engage in foreign commerce can apply.

That licensing and approval authorities be transferred to the Department of Commerce, with appropriate coordination with other agencies to insure that the national interest is protected in the licensing and approval of exports.

That the licensing of exports of nonmilitary nuclear facilities, material, and technology be made contingent upon a determination that safeguards against theft, diversions, and sabotage in recipient nations are substantially comparable to the safeguards requirements for commercial nuclear licenses in the United States.

That the determinations of safeguards comparability be made by the Nuclear Regulatory Commission.

That commercial nuclear exports by the United States be made in the context of meaningful international controls.

The motivations for this proposed bill are fairly self-evident. With the growth of the nuclear industry, there is concern that relatively easy access to plutonium and other special nuclear materials, worldwide, could pose a serious threat to the security of the United States.

Plutonium stolen abroad poses as great a danger as plutonium stolen in the United States. It is the intent of the present bill to tighten controls on the potential spread of plutonium and other special nuclear materials.

Establishing that a single lead agency is responsible for the critical determination regarding export of nuclear technology and material should not only help to streamline existing procedures, but should also assist in implementing the necessary controls we are striving for.

We certainly want to be sure that this proposed bill will indeed lead to the results we intend to achieve. Undue restrictions on U.S. nuclear exports that do not simultaneously reduce U.S. vulnerability to nuclear risks should be avoided.

We are very pleased that our witnesses could come today and give us their views and comments on this bill. We hope that they will be frank and candid with us and help us in the formulation of an export act which will have the intended results.

It is clear to me that the bill we introduce will not remedy all difficulties with respect to exports or avert all risks arising from the technologies involved. Yet if we define our objective in terms of minimizing those risks and difficulties, I believe the bill points the way toward achieving that objective. I congratulate Senators Percy and Ribicoff on their work to this end and am grateful and proud to be a part of their effort.

Chairman RIBICOFF. All opening statements will be in the record as if read in full.

Senator Percy, who has taken the lead in this field, do you have an opening statement?

OPENING STATEMENT OF SENATOR PERCY

Senator PERCY. Dr. Ikle, we appreciate your being here this morning. We know you had other conflicts, and we appreciate your setting those aside.

I had invited Secretary Kissinger to be here, because I know of his deep interest in this field. However, in my letter of invitation, I implied that I felt he should spend his time on other crises, and that you would be, in our judgment, an extraordinary witness in his stead.

Mr. Chairman, I want to thank you for the way that you have expedited these hearings, for your cosponsorship of this legislation, and for the decision that has been made to have a large part of the load in chairing the hearings carried by our distinguished colleague, and cosponsor of this legislation, Senator Glenn, who has expertise in this field, and to whom I would yield any day on technical matters.

They never chose me for my technical competence, but I would like to give just a brief statement, because I think it might be somewhat helpful to our principal witnesses, and to those of us who have put together this legislation, to know the spirit in which we have offered it, and why we have done so.

The issue we want to explore here today relates directly to the future of our own and world civilization. Whether we can now master the will to control the worldwide proliferation of the capacity to fashion deadly nuclear weapons from peaceful nuclear materials, is, I believe, central to the future of man.

Time is running out fast. We are literally racing the clock. The day when the United States held a monopoly in nuclear technology, engineering, and manufacturing is long past. Other major countries are fast developing and applying enrichment technology that may even be superior to our own, and less costly. They already have the capacity to reprocess spent reactor fuel and thus to manufacture—and to sell—their plutonium to still other countries.

As a practical matter, we thus have only a very short time—perhaps 2 or 3 years—during which the U.S. position as major world suppliers of enriched uranium can provide the basis on which we can lead the world toward adequate nuclear safeguards. The hope that we can bottle up the nuclear genie is completely vain. But what we can—what we must—do is strengthen in every way possible the safeguards all countries use to protect peaceful nuclear materials and facilities from diversion to purposes that are dangerous to mankind. This strengthening should be in the plain best interest of all nations.

Thus, the pragmatic question before us is how we can use the transistory U.S. position as the predominant nuclear supplier to improve substantially the safeguards all countries use to prevent theft and diversion.

S. 1439, which I have introduced with the cosponsorship of my distinguished colleagues, Senator Ribicoff and Senator Glenn, proposes one means by which such international safeguards might be upgraded.

The bill is the result of my request that the minority and majority staffs of the committee inquire in detail into the current organization of our Government to authorize nuclear exports, and that they draft a proposal that could serve as a focus for hearings. It stems from my concern that these hearings might merely provide the forum in which frightening pictures of nuclear sabotage and terrorism could be painted.

Instead, I wanted these hearings to have a constructive focus. I believe the bill provides a positive alternative that hopefully will assure people that, while we are airing the alarming problems, we are also intent on doing something concrete to correct them.

S. 1439 is only a proposal. Though it is based on staff interviews with well over 20 Government and private experts, it will be subject to modification and perfection through our open legislative processes. I hope our witnesses will freely propose improvements and alternatives. But I know that the Chairman will confirm my assurance that we are of serious purpose and intent—that this is an issue on which the committee does intend to leave its constructive mark.

One other volatile part of the world, where perhaps there is more death, hatred, and bitterness expressed, is the subcontinent. When the

PNE, peaceful nuclear explosion, went off in India, it was not only a shock to us, it was a shock to Canada, who provided the technical know-how; it was devastating to the Pakistanis; and probably it brought about the request and desire to lift the embargo on some conventional lines so that they can move forward there in an area where the resources ought to be going to many, many other things. So the impact of what we are talking about is a very real thing, felt all over the world now. Our expert testimony we have this morning, I think can shed a little or a great deal of light on the problem.

Chairman **Ribicoff**. Before we call on you, Dr. Ikle, I would like to make one comment, it is obvious to me the entire problem to which we address ourselves is one that will be of concern to us, and will involve all of us—the witnesses and this committee—for years in the future.

This committee, as far as I am concerned, has enlisted for the duration to follow this problem through. I am convinced that more and more, as the years go by, the world, and this Country, will realize the importance of either the evil or the good genie that has been released upon the world. I don't suppose we will ever put it back in the bottle again, and we better find out how best we can control it before it devastates the world, and singes and burns all mankind.

Dr. Ikle, do you have a prepared statement, or would you rather make some comments?

Dr. **Ikle**. Mr. Chairman, I would like to read a prepared statement, with your permission.

Chairman **Ribicoff**. Do you have a copy of your statement?

Dr. **Ikle**. We will provide you with one.

Chairman **Ribicoff**. Fine.

TESTIMONY OF DR. FRED IKLE, DIRECTOR OF THE ARMS CONTROL AND DISARMAMENT AGENCY; ACCOMPANIED BY JAMES L. MALONE, GENERAL COUNSEL

Dr. **Ikle**. Mr. Chairman, and members of the committee, I greatly appreciate this opportunity to appear before you.

I want to provide any information I can that will be helpful to this committee. Since we are trying to cope with new technology that will expand and spread over the years to come, it may be helpful to gain some historical perspective.

For 30 years now, our Government—both legislative and executive branches—have sought to prevent destructive uses of atomic energy while permitting legitimate peaceful uses.

Unfortunately, it is true to say that if nuclear technology did not serve any important peaceful purpose, the control of proliferation of nuclear bombs would be much easier.

As you recall, our first atomic energy legislation, the McMahon Act of 1946, placed great emphasis on preserving nuclear secrecy.

Five years later, in 1951, Congress amended the Atomic Energy Act so that we could share some nuclear information for military uses with countries of the North Atlantic Alliance.

The purpose was to strengthen the alliance, not to encourage peaceful applications.

But as the prospect for peaceful benefits of nuclear energy grew more realistic and more important, the U.S. policy was changed in an almost revolutionary way.

Congress passed the revised Atomic Energy Act of 1954. This revision gave permission—indeed, strong encouragement—for sharing nuclear information for peaceful purposes with a great many other nations, allies, as well as friendly nations.

The clear intent was to continue strict controls on weapon design information. We recognize now with the benefit of hindsight, that in a sense we had "locked the wrong barn door."

By transferring the technology for reactors that can produce plutonium, the most difficult element for a capability to manufacture explosives have been given away.

Holding on tightly to weapon design information might prevent the fabrication of advanced warhead types, but does little to prevent construction of nuclear device or bombs several times the destructive power of the Hiroshima bomb.

All of this is easier to see from hindsight, of course.

Our main purpose of the new policy that began with the revision of the Atomic Energy Act of 1954, was a valid and foresighted one: To build up international machinery that could control or at least monitor the legitimate peaceful applications of nuclear energy, to prevent diversion to destructive purposes.

In support of that objective, Congress gave its approval in 1957 to the establishment of the International Atomic Energy Agency, today one of the most effective and important organizations within the United Nations family.

American initiative was decisive in bringing this organization into being.

In the 1960's, the threat of nuclear proliferation attracted increasing attention. Through the Pastore Resolution of 1966, Congress paved the way for the nonproliferation Treaty of 1968—today one of the most important barriers against the further spread of nuclear weapons.

As you will recall, the week after next, the conference to review this treaty will begin in Geneva. We expect this review conference, which was envisaged by the treaty, to reaffirm the widest support for the treaty. Over 80 nations are now party to it. The Republic of Korea has just completed its ratification. I am sure, Mr. Chairman, and members of this committee, you will agree with me that this decision by the Government of Korea is a most gratifying development. We are hopeful that other important nations will soon complete their ratification of the Nonproliferation Treaty.

Today, not only the United States, but several industrial nations, are exporting nuclear fuel, equipment, and knowledge to many countries who do not yet have nuclear weapons.

More and more countries are looking to nuclear weapons. More and more countries are looking to nuclear reactors to help them meet their energy needs.

But that old problem is still with us. As nuclear technology spreads to more and more nations around the world for peaceful purposes, it can also provide the makings for nuclear weapons, unless strict controls can be maintained. And it appears there are now some countries that might want to take advantage of this nuclear trade, to develop the capability some day to produce their own nuclear weapons. If they should press ahead, it will begin to threaten their neighbors, who in turn will be tempted to follow suit.

There are things we can do. We can continually improve and work toward better international controls over exports of nuclear materials. We must make sure that commercial interests do not conflict with our long-term security needs.

We can take steps to strengthen the International Atomic Energy Agency, through financial and technical assistance. We can press for the support by all nations to make the Nonproliferation Treaty more effective, and we can act on every front to lessen the motivations for the acquisition of independent nuclear weapons capabilities.

Incidentally, Mr. Chairman, Senator Glenn, this means that we must sustain our alliance commitments, lest other nations now depending on these commitments, feel compelled to acquire nuclear arms.

The United States cannot of course accomplish international controls alone; but it can, as a first and foremost nuclear nation, take the lead.

In fact, it is my opinion the United States is the only nation that can do that, and, of course, the support by members of your committee, and the Congress will be crucial here as they have always been in the control of nuclear energy.

Thank you, Mr. Chairman.

Chairman RIBICOFF. Dr. Ikle, today's New York Times reports that the United States has developed a new laser separation method for enriching uranium to be used as nuclear fuel, or for weapons purposes.

It has also been reported recently that South Africa has developed a new spray nozzle system of enriching uranium.

Do these developments mean that it will be easier for nations to prepare materials for nuclear weapons?

Dr. IKLE. You have to separate here the very advanced type of technology that is being explored in connection with laser induced micro-explosions for the production of energy. This highly advanced technology, as I understand it, is not yet actually in being. It is not likely to contribute to the risk of proliferation because it is very advanced technology. You may, however, want to get more expert technology testimony on it.

Countries that possess this technology are, of course, well advanced in their capability to make nuclear weapons, if they so desire

On the other hand, the fact that new technology is coming along for enriching uranium, of course, is of great importance in the context of non-proliferation policies.

Chairman RIBICOFF. Do you think that if these new technologies are not readily available, are to be developed by other nations, do you believe that the United States should be very, very careful as to whether it makes these specialized technologies available to other countries in the world?

Dr. IKLE. To the extent that nuclear technology could enhance the capability of other countries to manufacture nuclear explosives, we must indeed be very careful in how we control it. However, to the extent that technology can serve only peaceful purposes, this risk, of course, does not arise.

Chairman RIBICOFF. I would hope the gentlemen who will be testifying on the panel, will be thinking about the impact of these new technologies, and about what the U.S. policy should be in relation thereto.

What I am talking about is laser separation, not laser fusion. Is this clear?

Dr. IKLE. I misunderstood you, Mr. Chairman.

Chairman RIBICOFF. I am talking about laser separation, as reported today in the New York Times. I do not know if you have yet read the article as to what is going on at Los Alamos.

Dr. IKLE. I misunderstood you, Mr. Chairman. You are referring to potential new technology for enriching uranium, and we are of course deeply concerned by the spread of the capability to make highly enriched uranium that could be used for weapons purposes.

Chairman RIBICOFF. This is what I am referring to. Will these developments make it easier for nations to prepare nuclear weapons, and will they lead to a greater worldwide proliferation of nuclear weapons?

Dr. IKLE. This risk is a very serious one, to the extent that other nations, with some technology and industrial capability, can build for themselves equipment that they can use to enrich uranium. They could, of course, go ahead and manufacture weapons, if they so desire.

Chairman RIBICOFF. So we are facing another expansion of this entire problem.

Dr. IKLE. As we look at it—and we have to understand here that actual technological forecasts are uncertain—but as we generally look at it, over the next 10 to 15 years, the capability to either manufacture enriched uranium for weapons purposes or to manufacture plutonium that could be used for weapons purposes, will inevitably become available to a larger and larger number of countries.

Chairman RIBICOFF. Let me ask you, you have stated the acquisition of peaceful nuclear technology inevitably gives materials personnel, and ability needed to build nuclear weapons. In what specific ways are present safeguards, as administered by the International Atomic Energy Agency, inadequate to detect division of nuclear materials and conversion of nuclear technology from peaceful to weapons purposes?

Dr. IKLE. The adequacy of the IAEA safeguards is a question of great importance, and has to be continually reviewed.

The International Atomic Energy Agency is a small organization with limited financial means. The peaceful applications of nuclear technology, as stated, are expanding; therefore, just to keep even with the developments, we envision that the IAEA must continue to grow and at the same time become more efficient in the utilization of its limited resources.

In addition, technological assistance can be provided to the agency that would make the job easier, for instance, in my agency, we have engaged in research and development efforts to provide monitoring equipment to facilitate the safeguards activities of the IAEA.

Chairman RIBICOFF. You call the threat of terrorists theft of plutonium, or of other weapons-grade nuclear materials a "nightmare."

Given the present level of opportunity in the United States and throughout the world, what are the chances that such a theft could take place today?

Dr. Ikle. It is very hard to assess the probability of an event like this. We have, of course, as you know, improved safeguards and protective measures in this country, and we are cooperating with and encouraging other countries to improve the physical security of their nuclear installations.

The International Atomic Energy Agency right now has a committee at work to develop better guidelines on physical security, but it is a job that we cannot consider as being finished. We continuously will have to work on it.

It will expand because of the increasing amounts of plutonium, and perhaps later enriched uranium that will be trans-shipped from country to country throughout the world.

Chairman Ribicoff. Let me ask you, in the event of such a theft by a sophisticated terrorist organization, could they successfully build and detonate a bomb?

Dr. Ikle. One should not be alarmed in an unproductive way about this long-term problem.

It is a problem for the more distant future, but one on which we have to start working very actively now.

As to whether an organization that stole plutonium or highly enriched uranium could manufacture that material into an explosive device, of course, would depend on the technical capability and the knowledge of the group. On this question, different scientific experts have come to different conclusions.

It is perhaps fair to state that it is not as simple a job for a terrorist, happily, to fashion a nuclear bomb as to put dynamite together; it is much more complicated.

Chairman Ribicoff. Yes, but these terrorist organizations are not just muscle men. They include highly educated individuals with technical skills. Is it possible that they have the scientific knowledge within these larger terrorist organizations to fashion a bomb?

Dr. Ikle. Certainly it is possible, and indeed, it is a threat with which we are concerned, that a group, whether associated with a nation or what you might call a "terrorist group" could put a skilled team together that could fashion an explosive, if they obtained the requisite plutonium or enriched uranium.

Chairman Ribicoff. What would the consequences be if this type of bomb were detonated in any mojor city in the world?

Dr. Ikle. Well, it is, I think, a contingency. I am sure, Mr. Chairman, you agree with me, but one hesitates to speak lightly.

It is an event that would change the world.

Chairman Ribicoff. In other words, there would be a possibility of a great destruction.

Dr. Ikle. Well, that depends on what the experts call the efficiency of the device, and the amount of material. Given a certain amount of material, the greater the expertise, the greater the explosive efficiency. In that sense, a nation or an organization that lacked the expertise that we have would in all likelihood not be able to make a so-called efficient device. That is to say, the destructive power would be less than the destructive power that our expert laboratories could obtain from the same amount of material.

Chairman RIBICOFF. Since it is relative, if you are sophisticated you could destroy a city of 5 million, but if you are unsophisticated, you could destroy a city of 500,000. Is that not what we are talking about, really?

Dr. IKLE. This fairly, Mr. Chairman, describes the problem.

It is not for the purpose of belittling the problem that I made the point that there are differences in the efficiency in which such a device could be manufactured. Even a so-called inefficient device, would still be of catastrophic proportions.

Chairman RIBICOFF. When you are dealing with the large nuclear powers, there is a sense of responsibility because they realize the consequences to themselves; but when you are dealing with a revolutionary force, or a terrorist organization, which is willing to go to any means to achieve its ends, then you will have the potential of great disasters, because there is complete irresponsibility, and also an indifference to the consequences to themselves.

Dr. IKLE. Without wanting to comment on the relative responsibility of various countries, Mr. Chairman, I do agree that our principal approach in preventing the use of nuclear destructive devices, that is to say, the approach of nuclear deterrents, would not be applicable to these threats, in all likelihood.

That is the core of the problem.

Chairman RIBICOFF. Well, if that then is the case, what organization should have the responsibility for safeguarding plutonium reprocessing plants and other fuel facilities around the world? Where should that responsibility lie?

Dr. IKLE. Ideally one would probably wish a strong well-run international organization to control all the dangerous nuclear materials.

As you well know, we in the United States have made two major attempts, one of which partially succeeded, one of which failed. The first attempt was the Baruch plan which was not accepted, and the second attempt was the initial and stronger version of the International Atomic Energy Agency which was not accepted, but after which, we were able to help create the International Atomic Energy Agency in its present version.

Chairman RIBICOFF. When you say they were not accepted, what nations were the cause of the failure?

Dr. IKLE. Well, the history of the Baruch Plan or proposal was of course, that the Soviet Union in 1946–47, rejected that approach.

Our initial 1954 approach to a stronger International Atomic Energy Agency was rejected in part by the Soviet Union, and I recall in part by other countries, too.

Chairman RIBICOFF. Have there been any recent attempts to go back to strong international controls?

Dr. IKLE. We are exploring the possibilities for strengthening international controls, and we certainly want to strengthen, as I mentioned before, the International Atomic Energy Agency.

At this time, there is no specific and definite scheme for a new approach.

Chairman RIBICOFF. My 10 minutes have expired for the first round of questioning. We will confine ourselves to 10 minutes.

Senator Glenn?

Senator Glenn. I would like to follow up on just a little bit of some of your line of questioning.

I think this new laser technology that was announced in the paper today—and which I understand has been known generally to the scientific community for some time, although it was written up today as being some new huge breakthrough—this technique basically uses lasers for their sympathetic vibrations in separating isotopes that now are processed only by the lengthy and costly gaseous diffusion program.

If this new laser technique is generally applied—and I think we can assume that laser technology will continue to expand around the world very, very rapidly—I would presume this might be what we might term a "reverse breakthrough"—a negative breakthrough for permitting almost every nation in the world to be able to break down these isotopes by a quite cheap means.

This would appear to be something that makes this bill, as a matter of fact, particularly appropriate right now. In light of this new information, it may mean that whatever interagency control system we establish, should not be set up particularly around plutonium reprocessing because now, all at once, here is a new way of bypassing the whole reprocessing procedure in the making of material for potential use in atomic weapons.

There is a whole new development here. It is a whole new source of nuclear material as dangerous as plutonium. It will be available to almost any nation as laser technology, in turn, goes around the world.

Do you see any major changes, or do you have any comment? I did not mean to make a speech here.

Mr. Ikle. Nothing more, Senator Glenn, but basically to agree with the thrust of your statement that new technology for the enrichment of uranium will place an added burden on our efforts to control the spread of nuclear explosives, and at some future time, may be more difficult to manage, more threatening than the plutonium economy that we see coming.

Senator Glenn. This is one of several different things that we know about in the nuclear-technology mill. I am sure we can expect the expansion of new plutonium and enriched uranium around the world in larger amounts by these techniques, as well as by the reprocessing and enrichment that we have known up until now.

Let me draw back to another line now.

Let's define just the current amount of business that we do internationally in the atomic energy field. What do we project this to be? How many licenses did we issue during the last 2 years? How great a factor is this on our balance of payments? We do not read much about this.

I would like to define the amount of business we do and get you to comment on other nations that have not signed Nuclear Non-Proliferation Treaty, such as France, that are exporting and making quite an impact on international nuclear trade.

Do you have some comments on that, and can you define the overall problem first?

Dr. Ikle. Senator Glenn, I do not have the figures here.

We would be pleased to provide them for the record—the number of licenses or the total dollar amount of our exports in the nuclear energy field.

Chairman RIBICOFF. I just wondered—the question that Senator Glenn asked is so important—is there anybody who will testify subsequent to Dr. Ikle, who has that information? I would like Senator Glenn's question answered if someone else in this room may have that answer.

[Dr. Friedman, (Rises).]

Chairman RIBICOFF. Will you tell us?

Dr. FRIEDMAN. That information was included in a statement which Senator Pastore inserted in the Congressional Record.

I do not have that statement with me. I am sorry. We do have it.

Chairman RIBICOFF. I think it is important to have that stated.

I am sure Senator Glenn would like it and so would I.

I think it is important to know publicly what that is. Why don't you give it to us right now?

Dr. FRIEDMAN. If I may have one moment to find it.

Chairman RIBICOFF. Certainly.[1]

Senator GLENN. All I am trying to find, Mr. Chairman, is whether we deal in such a way that it will be on the record. Are we dealing with one or two licenses a few people can monitor very thoroughly, or are we dealing with thousands of licenses that are being granted around thet world? Are the French selling 500 plants a year; are we selling 80 or 200?

Our own President has called in our country for 200 by 1985, which I think is probably an unrealistic goal, but it indicates that if other nations are planning similar activity, we are talking about a whole different level of control and monitoring than would be otherwise.

Mr. IKLE. To give you some rough indications of the magnitude we are talking about, agreements for cooperation to provide some 2 dozen reactors are in a state of discussion. A reactor may mean a price tag of $600 million or more, and there are two or three other nations—France, the Federal Republic of Germany and maybe one or two others—which are able to export nuclear reactors; so it is not a matter of thousands but maybe a dozen or two such transactions.

Senator GLENN. Do we have any commitments to continue the sale of nuclear materials, for instance, that are not now generally known publicly?

We have been—I think most people have been somewhat shocked by the handling of, say, the South African sale that has received some publicity, and we might want to use it later as a case study to learn how these things are really approached and proliferated and how the proposed interagency realignment of responsibility would have prevented this or would have made it a more controlled situation than apparently it was. Do you have any comments?

Dr. IKLE. I think the distinction should be made here between the Congress and the appropriate Congressional committees having the information, and full public knowledge. The information regarding these transactions, of course, is available to Congress.

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[1] See appendix p. 522.

Some of these transactions, for the right or wrong reasons, attract more publicity than others.

Chairman RIBICOFF. Doctor Friedman, do you have that information now?

Dr. FRIEDMAN. Yes, I do.

Chairman RIBICOFF. Will you give it to us at this point?

Dr. FRIEDMAN. I am sorry, it was Mr. Price's statement and he said, last year U.S. sales of uranium and enrichment services abroad totalled $421 million and expected sales over the next 10 years would amount to about $5 billion at today's prices.

This, he said, is in addition to between $1.5 and $2 billion annually in sales of services, equipment, and facilities by U. S. industry.

Chairman RIBICOFF. How about the other half of Senator Glenn's question, as to what is being sold by nations other than the U. S.? Is that in there?

Dr. FRIEDMAN. That is in Senator Pastore's statement in tabular form. It is somewhat difficult to extract. Again, if you will permit me when I am on the panel, maybe we will do that.

Chairman RIBICOFF. All right.

Senator GLENN. On your current methods of licensing, do you think that this would be enhanced if we had to look at it from a business standpoint—a lead agency concept of licensing such as is proposed in this bill?

I am not asking for a blanket approval of this bill. I know the Administration perhaps has not talked with all of the agencies and come up with a position, so I am not asking for a support or denial of what is being proposed. I would solicit your comments in regard to the specific question of licensing, however.

Dr. IKLE. Efficient coordination concerning licensing decisions is very important in order to bring together the legitimate commercial interests and points that have to be brought to bear with regard to foreign policy and considerations.

It is my view that we have an efficient mechanism for coordinating these decisions, and in particular, from where I sit, to bring in foreign policy considerations, but you are right, Senator Glenn, I did not have the time, as you recognized, to analyze the proposed bill and we do not have an administrative response on it.

Senator GLENN. You stressed in your statement the importance of control of exports and nuclear material that are commensurate with our own security needs here, the importance of support for the International Atomic Energy, the importance of making NPT more effective, and the importance of sustaining our alliance commitments—that we could not go it alone. Obviously, we want to stress the same things in any new interagency setup in our Government, to be sure that it reflects those international interests, because that will be of primary importance to us in the future.

Have you had any difficulty under the current setup in working with IAEA, for instance, or in working out cooperative arrangements?

I understand that the IAEA is working fully undermanned and has a very small operation, compared with the size of the problem.

What I am getting at is nuclear proliferation something we can control internationally with other nations, or is it something we have to deal with by protecting our own exports of material, or are we forced to enter into an international arrangement in which we have to give up some of our own authority to them? That would alter our own interagency relationship as provided in this bill.

Dr. Ikle. We do need an internationalized approach and particularly since we are not the only supplier of this technology, but also, because recipient countries, in many cases, are more receptive to international safeguards, than to just bilateral safeguard arrangements.

Senator Glenn. Do the French, for instance, do they require any safeguards at all, or are they just interested in selling nuclear equipment and material?

Dr. Ikle. No, the government of France does require safeguards, usually IAEA type safeguards on their exports.

Senator Glenn. All right. My time is up.

Chairman Ribicoff. Senator Percy?

Senator Percy. I would like to talk for just a moment, Dr. Ikle, and have your judgment on the export policy of this country.

How would you characterize the U.S. Nuclear Export Policy?

Do you think we have a consistently thought-through policy?

Dr. Ikle. Senator Percy, it is in part in anticipation of this question or in response to this question that I initially made a few points about the historic development of our export policy in order to put it into a larger context. I think it is only if you put it into a larger context that you can appreciate these long-term developments, such as the one mentioned by Senator Glenn, laser technology, and plan ahead.

Quite clearly, I think we can all admit and recognize that we are taking a critical look at our export policy. In an effort to try to tighten up safeguards and regulations, we are turning in a different direction than the turn we took in 1945.

Now, how far we can go in this new direction, without becoming counterproductive is really the criminal question, since we are, to repeat once more, no longer the only suppliers of nuclear technology.

To simply cut ourselves off from the countries that wish to import technology and thus permit other countries to step in, we may have less influence than we sought to develop a more balanced policy.

Senator Percy. Would you characterize our current organizations of our Government for authorizing nuclear exports as somewhat confusing, as a result of sort of evolution?

Dr. Ikle. It is an evolutionary policy. It has many layers; it is very complex, if I may use that term, instead of saying confused.

An extensive report has been prepared on this policy in compliance with an amendment introduced by Senator Stevenson.

Senator Percy. Would it be the end result of this confusion that led to the situation, which is particularly disturbing to me, where we made a decision to export to date about 100 pounds of highly enriched weapons-grade uranium to South Africa, which would be enough for about 10 bombs, and then we licensed a U.S. computer to assist the South African governments to build its own enrichment plant.

Is that a desirable development?

Dr. IKLE. I am not sure whether the publicity attendant on this export really gives a well-rounded picture.

We are talking here, if I remember correctly, about a research reactor using highly enriched uranium, which has been in operation for a long time; and we are talking about a country, which was just mentioned by Senator Glenn, that recently announced it had successfully tested its own uranium enrichment technology. The question arises about what additional capability is being added by supplying this highly enriched uranium to South Africa.

This reactor went critical in 1965. This highly enriched uranium reactor is something that has been in operation for 10 years.

Senator PERCY. Do we have any evidence or suspicion that enriched uranium from South Africa has been introduced to any country in the Middle East?

Dr. IKLE. I do not know of any suspicion.

Senator PERCY. What was the role of ACDA in South African development?

Did your agency know of it?

Dr. IKLE. This goes back to a decision to provide the research reactor in the early 1960's or perhaps before. Actually ACDA was established in 1961, and I would have to check whether back in those years the agency was involved in the decision.

Of course, IAEA safeguards are applicable to this research reactor.

Senator PERCY. Are there any efforts being made within the Federal Government that you know of to stop this export?

Dr. IKLE. We have a very active work going on to constantly reexamine our export policy, to see what we can do together with other nations, say in the framework of the IAEA. We also continually reexamine any changes in the procedures that might be needed.

We have tightened up, maybe a half year ago or so, the coordination process among the various agencies.

Senator PERCY. Could you describe a little more what role your agency has now in the establishment of that policy, and has your agency taken a position to attempt to stop such exports that might be subject to question?

If you have not taken any steps, why not?

Dr. IKLE. We have taken very active steps, and it is the role of the Arms Control and Disarmament Agency to consider first of all, our treaty obligations, such as the Non-Proliferation Treaty, which impose an obligation on us not to contribute to the spread of nuclear weapons.

Second, for each individual decision, whether it be sales of reactors to Israel or Iran, or some other export decision, we participate together with the other appropriate agencies. We make our inputs and argue whatever the case may be for not going ahead with a particular export, or for imposing restrictions or for approving.

Senator PERCY. Decades ago, a proposal was made that the nuclear countries establish international facilities for enriching uranium and reprocessing spent fuel.

It would seem that this would be a more economical way of doing it, and it might well provide reduced possibilities for diversion and misuse of material.

Could you comment, Dr. Ikle, on the potential such proposal might offer and what your own position, the position of the agency, is on it?

Why can't we identify and create facilities in six or seven easily accessible sites in the world that would serve the major world regions for key manufacturing stages for nuclear fuel cycle?

Dr. Ikle. We look forward to the possibility of the multilateral or international arrangements for reprocessing plutonium, and perhaps in the more distant future, the possibility of multinational agencies for enriching uranium might be considered.

It has indeed, Senator Percy, the advantage of making safeguards against proliferation more effective because it would have nationals of several countries cooperating, particularly countries that may be close neighbors; and hence, if they are not assured of each other's attention, they get into competition or competitive situations, leading to a small nuclear arms race, which we want to prevent.

Second, while the evaluations are not quite completed, they appear to point toward the conclusion that also, from an economic standpoint, larger facilities would be more efficient. Happily, therefore, we have a coincidence of what we would want from an arms control point of view and what you would want from the point of economic efficiency.

Senator Percy. If there are very distinct advantages, in your judgment, what is impeding a U.S. effort toward moving toward this objective?

Is there any agency of Government standing in the way of this? For instance, is the State Department, ERDA, or anyone else raising objections and impeding our progress?

Dr. Ikle. Senator Percy, the problem is not internal, it is external.

This development will be paced by the degree to which other nations that want to move ahead in developing their own autonomous fuel cycle are willing to share in development, indeed, to intermingle with other countries in setting up such a fuel cycle. What you have here are national motivations which militate toward developing a situation where no other nation could interfere or intervene in a nation's fuel supply.

Senator Percy. On the question that Senator Glenn raised on the new laser technique announced this morning, would that announcement have been made by us, if it was not discovered that scientists in the Soviet Union have also developed a similar technique?

Dr. Ikle. The possibility of enriching uranium with the laser approach has been discussed in scientific journals for some time, in fact the first discussion appeared several years ago, so in that sense, it is not new. The extent to which it would be commercially feasible or technically feasible, that is still an open question.

Senator Percy. Would it be desirable for the Soviet Union and the United States to place high priority on bilateral discussions, or have priority talks take place, as to whether or not a policy should be adopted by both countries to strictly control spread of this new technology, taking into account that such knowledge makes peaceful nuclear energy much cheaper, but also it makes the potential of creating economical destructive weapons much easier.

Dr. Ikle. It would be desirable; it is desirable; and it is being done.

In this context, we have to keep in mind the structures that already exist for cooperation with the Soviet Union and the many other countries which are members of the International Atomic Energy Agency. These structures gain increasing importance because of their political constraint and when added to the strictures of the Nonproliferation Treaty provide best for the long-term future, since technological constraints will become increasingly ineffective in light of the general spread of technology.

Only a few days ago, we sat down together with Soviet representatives and British representatives in London, as the three depository powers of the Nonproliferation Treaty, to discuss the future of that treaty and the review conference.

Senator PERCY. And did those discussions deal directly with this new laser technique?

Dr. IKLE. Those discussions dealt with the Nonproliferation Treaty and the NPT Review Conference in particular.

Senator PERCY. Do I understand the discussions——

Dr. IKLE. Of course, it is very much embodied in the treaty that the objective is to prevent the diffusion of the capability for making nuclear explosives, and hence, any kind of technology, whether laser or otherwise, would be within the purview of that treaty.

Senator PERCY. Mr. Chairman, my time is up.

Dr. IKLE. I hope I have answered your question.

Senator PERCY. Well, I think before I leave, if my colleagues would not mind, and just so I understand, is it clear that discussions have occurred between the United States and the Soviet Union already on this new laser technique and have pertained to the desirability of controlling the proliferation of that knowledge and the spread of that scientific technique?

Dr. IKLE. The discussions that have taken place, both within the framework of the IAEA with other countries and this meeting in London that I have referred to, were in broader context, looking at all technologies, not only on laser technology. There is no reason to have a meeting or particular session on just that one issue.

It is only part and parcel of the larger problem.

Senator PERCY. Mr. Chairman, I would like to comment that Dr. Ikle's testimony is a model for all witnesses before the Congress.

I do not imagine we have ever been able to ask more questions and to have them answered more precisely than you have done this morning. We appreciate it.

Dr. IKLE. Thank you.

Chairman RIBICOFF. I would like the opportunity for myself and others to submit written questions to you for the record and have your responses that way. Thank you very much.

Senator GLENN. May I ask one question, Mr. Chairman?

Let me ask just one more question and that is rather fundamental to I think our whole consideration.

It seems to me that through much of our nuclear energy development, we have relied on having a technological monopoly—if you want to term it that—in this field, and on our ability to control our monopoly or work in concert with other nations who had a similar monopoly—near monopoly, say—among just a few nations.

Now, technological monopolies are very short lived in this modern world, and what is one nation's information privately now will become another nation's common knowledge a very few years hence.

In this whole effort of arms control, it would seem to me that we are just at about a breakout point, where this type technology is available to everyone. I do not want to castigate your efforts here, but I wonder whether we are not in a situation where, instead of having arms control, we almost have arms out of control, or bordering on that status, by just the proliferation of that information to almost everyone all over the world.

I would solicit your comments later—I know we have a time limitation now—but either privately by letter, or for the record, I would like to know what you feel can be done to better control this whole area.

I know that is your day-in, day-out work. At the same time, I think technology—like the laser information we have discussed this morning—is breaking out to the extent that instead of having nuclear arms control, we are bordering on atomic arms out of control. I would certainly appreciate your comments on what you think would be any new, better means of coping with this.

I do not think we can go just with plutonium reprocessing controls because one of these days we will have centrifuge techniques and laser techniques and possibly 14 more techniques by 2 years from now for producing weapons-grade nuclear materials. Technology will break out somewhere else, and we need a whole new concept of controls if we are to really have nuclear arms control that is meaningful and not just a cosmetic.

Mr. IKLE. I fully agree, Senator Glenn, in a way we are moving into what I call a "new nuclear era," we have to develop the instruments and consensus to maintain control of nuclear explosives so they will not be used for destructive purposes.

This will require a process of building up institutions, organizations, techniques, technology. It is a major new change, but we must look at this positively.

We in the United States, in the past, have been very effective and very inventive in building international organizations and providing the technology to make them efficient, so I think one should look at this as a promising pressure, a pressure provided by the development of technology, that will force us to look at international cooperation constructively. We cannot be defeatist about it because, if we are, the future of not only our security but the structure of our society will be totally jeopardized.

Senator GLENN. I appreciate your patience.

Senator PERCY. Mr. Chairman, may I ask that Dr. Ikle be permitted to submit to the committee responses to any of the questions that we ask him, particularly about the new laser technique on a classified basis, if it would add to our information.

I realize we get into areas that it is difficult for you to answer fully in open hearing. If we could be enlightened by a classification placed on any document you care to give, we would appreciate that very much.

Dr. IKLE. I would be pleased to do this, with the proviso that where we get into areas which really are the province of my colleagues in ERDA, we can turn to them and have that agency provide you the information.

Senator Percy. The thrust of my comments, which is a status of bilateral discussion with the Soviet Union on new laser technique and how they would be controlled, I would like you to have available to us.

Dr. Ikle. Certainly. I would like to respond to your questions.

Chairman Ribicoff. Thank you, Dr. Ikle.

Our first panel of witnesses today is composed of Mr. John F. O'Leary, former Director of Licensing, Atomic Energy Commission, Mr. David M. Rosenbaum, nuclear safeguards specialist; and Mr. Mason Willrich, professor of law, University of Virginia.

TESTIMONY OF JOHN F. O'LEARY, DIRECTOR OF LICENSING, ATOMIC ENERGY COMMISSION

Chairman Ribicoff. Will you gentlemen identify yourselves?

Mr. O'Leary. My name is John P. O'Leary.

Mr. Rosenbaum. I am David M. Rosenbaum.

Mr. Willrich. I am Mason Willrich.

Chairman Ribicoff. Would you like to make a statement, one or two of you, or all of you?

Mr. O'Leary. I have filed a statement with the committee for the record. I would like to make a very short supplementary statement.

Chairman Ribicoff. You go ahead, and your entire statement will be entered in the record at the end of your testimony.

Mr. O'Leary. First of all, I think the committee should know that among the options I have examined for providing energy for the United States, nuclear appears to be the one most highly desirable.

That is my starting point for these discussions. I think in order to secure the option, there are three broad ranges of problems we have to deal with, first of all safety, and I think we are well along on that.

The work that ERDA and NRC have done over the past few months or their predecessor agencies over the past year and a half or 2 years, are really bringing that along to the point that I think we can feel comfortable, at least prospectively.

Storage is the second major question. How can we assure that this will not, this type of technology will not go on and on through the ages, causing damage.

I think the Atomic Energy Commission and successor agencies have not addressed that problem adequately.

There are signs now in the press that ERDA is beginning only in the past few weeks to look realistically at this problem.

I think it is solvable. It can be solved, and hopefully we will be able to put that one out of the way.

The third, and I think far and away the most difficult of these problems has to do with the problem of the safeguarding of these materials, to be sure they do not fall into the wrong hands and cause major damage to the public health and safety.

The AEC during my tenure was only beginning to address the problem.

To understand it, I think you have to recognize, Mr. Chairman, that we have seen in most weapons systems the transfer in a remarkable short period of time from the rare to the common.

In 1945, we looked upon the infrastructure requirements for nuclear energy as being enormous, beyond the capabilities of any State other than the United States.

From the standpoint of 1945, we were assured of many, many years of absolute monopoly in the nucelar business; yet we found by 1949, that particular myth was exploded, the infrastructure requirements were not that great, we were beginning to see the commonality of that particular set of weapons.

We have gotten to the point where a few people, well instructed in the technology, poorly funded, using materials freely available on the economy, except for the special nuclear material itself, can in the very good judgment of the experts in this field, put together at least a workable crude nuclear weapon.

I think we have to contend with that as a fact of life.

There is a fourth point, and it has to do with the safeguard issue of proliferation. I think we have gotten to the point where in fact the technology is so common, that we will see, regardless of whether we like it or not, the spread of the capability, not perhaps the actual application, but the capability among most of the nations of the world, within the next 10 to 15 years, of making nuclear weapons. And I think we will have to address the problem of international safeguards as a matter of higher urgency than has been the case in the past, as the spread of reactors throughout the world has been accelerated. And I think it will continue to accelerate in the next 10 years, as the means and materials fall into the hands of all nations that have nuclear reactors to do processing on a small scale, to make plutonium. It only takes a little plutonium to make a weapon, and the weapon's capability is there, and we must see that safeguards are provided.

My idea is to discuss very briefly the aspects of this problem, first, who controls the exports.

I think we find here a variant of the old shell game. In fact, it is very, very difficult for anyone in the system to find out who has the responsibility. The NRC, or at least it predecessor agency the AEC, did the actual licensing, but in fact, its action in issuing the licensing was purely ministerial.

They did not exercise judgment. It was based upon the assumption that the Department of State, the Arms Control Administration, and others would go through all of the necessary clearances, and the regulatory function in issuing the license was simply to put a stamp on it.

The second point has to do with the fundamental role of the International Atomic Energy Agency, and I think you should have clearly in mind that that role is a single-purpose role formally, that is to say, it is to avoid diversion by states, not theft by paramilitary groups, or of terroist groups. In addressing the proliferation problem, it utilizes only one means of obtaining that objective and that is inventory control. It does not go into the other aspects of providing this material, although it does informally provide guidance to members with regard to maintaining the physical security of these materials.

With that, Mr. Chairman, I close this informal statement.

Chairman Ribicoff. Dr. Rosenbaum.

TESTIMONY OF DAVID M. ROSENBAUM, NUCLEAR SAFEGUARD SPECIALIST

Dr. Rosenbaum. I have, Mr. Chairman, already submitted a statement for the record. With your permission, I will just say a few words to summarize my point of view.

I think the technology and the knowledge of how to make nuclear weapons is very widespread in the world.

Tens of thousands of students from countries which are potential manufacturers of nuclear weapons have studied science and engineering at universities in this country. Many hundreds, perhaps thousands, have been trained in our own national laboratories.

I asked, some time ago for a list, not of all those who have been trained here in these fields, but only of those who were presently being trained here in nuclear physics and engineering from certain countries. No such list exists, as far as I know, and there are no controls over the dissemination of this sort of knowledge through training in this country.

There are two separate problems. One is the proliferation of weapons among States, and the other is the proliferation of weapons among subnational groups.

States have an intrinsically conservative philosophy about this sort of problem, because they can be retaliated against.

Indeed, so far all of our protective actions about nuclear weapons have been on the basis of retaliation. Subnational groups which have no territory, and which might be as small as a handful of people, have no such fear.

It is not only a question of whether they care about their own well-being. There may be no one to retaliate against. We see how hard it is now, for instance, for the FBI to find people on their 10-most-wanted list, particularly those who style themselves as revolutionaries. They are frequently not caught for years, even though they are in this country.

I think, therefore, that our efforts ought to be focused mostly on the problem of keeping weapons, and the materials to make them, out of the hands of subnational groups. This is a goal we can share with almost every country in the world. I heartily support the provision in this bill for setting up substantial training programs which we can offer to other governments, to help them safeguard their own material. I hope that we will also sell them appropriate equipment which we have developed.

No government, however radical, wants to have its own material stolen by any subnational group. I think if training is done on a voluntary basis, we may get a great deal of cooperation from other governments.

The last thing I would like to say, is that I am very skeptical about the performance of existing international agencies in this area.

I think that it is a good idea to strengthen them as much as possible, and I support that, but I think it is a bad idea to delude ourselves as to how much safety we are going to get through that process.

We ought to face the fact that an agency which is made up of scores of nations is, by its nature, not very decisive. If one looks at the IAEA as a model, I do not think it gives one a great deal of comfort. The questions I think ought to be asked about centralized reprocessing, for example, are: In whose country will it be located? Who will staff it? Whose nationals will be in charge of the security organization?

I have been told by U.S. members of international organizations that they find themselves in the position of having been sent over as international civil servants, without any prior briefing at all, but find that their compatriots from other countries essentially see their role as defending their own national interests. I think that we ought to do everything we can to strengthen international agencies in this area, but we should not delude ourselves by depending too much on such agencies.

Chairman RIBICOFF. Dr. Rosenbaum, your comments are very important.

In watching international organizations work, I have become increasingly skeptical concerning their effectiveness.

It seems more and more they gang up on the United States, which supplies the money and the technology, and as you indicate, it has been my observation too that in most international organizations, the representatives of the United States are constantly left with egg on their face, without any instructions, without any supervision, without any basic American policy, and consequently, we find huge sums of money supplied by the United States being used against U.S. interests.

This entire field, in my opinion, should be reviewed by this committee, which has a responsibility in here, and I asked the staff to get some preliminary data together, and I am pleased to have your comments at this time.

There is a vote going on at the present time, so we will suspend for 10 minutes in order to vote, and we will be back.

Senator PERCY. Mr. Chairman, I would like to comment on your own very, very important comments. I served as a delegate in the United Nations in the last 3 months of last year representing the Congress, and I have served as the delegate to other overseas operations in international organizations.

I was shocked to find that the Foreign Relations Committee has not held hearings for 20 years on what our role is in these international organizations, particularly the United Nations, and I have called for such hearings.

We are scheduling them, and we have a cast of witnesses for those hearings, and we would be delighted to have you testify, Mr. Chairman, but certainly the questions that you have put will be put to these expert witnesses, including the Administration to think through what our role is in these international organizations.

Chairman RIBICOFF. The committee will stand in recess for 10 minutes.

[Whereupon, the committee was in short recess.]

Senator GLENN. If we could reconvene, I am sorry for the inconvenience of the delay, but that is something a little out of control.

Mr. Rosenbaum, I do not know whether you had finished your comments there or not.

Had you finished your statement?

Mr. ROSENBAUM. Yes, sir.

Senator GLENN. Fine.

Mr. Willrich, do you have a comment to make?

Mr. WILLRICH. Thank you, Senator Glenn. I have submitted a statement which I would like to have printed in the record.

I would like to summarize from that statement for you, if I may.

Senator GLENN. Please go ahead and present your statement as you wish.

TESTIMONY OF MASON WILLRICH, PROFESSOR OF LAW, UNIVERSITY OF VIRGINIA

Mr. WILLRICH. Mr. Chairman, I welcome the opportunity to assist in your consideration of the Export Reorganization Act of 1975, S. 1439. My testimony is limited to the parts of the bill that pertain to the export of nonmilitary nuclear facilities, material and technology.

I will first outline the relevant trends in the development of a worldwide nuclear power industry. Next I will consider the provisions of S. 1439 in the context of U.S. Government organization to develop and implement a nuclear export policy. Finally, I will outline some substantive suggestions for such a policy.

Given international political realities, there are a variety of motives for national governments to establish nuclear power programs. These include: low-cost electric power; increased energy security; and creation of a nuclear weapons option.

The economics of nuclear power were strengthened by the world oil price explosion in 1973–74. A compelling economic case for nuclear power can now be made in industrially advanced countries with relatively large electric power grids. Moreover, the current high oil price provides an economic rationale for smaller nuclear power reactors in a much larger number of countries with relatively small electric power grids.

Nuclear power can offer increased security of energy supply basically in two ways: (1), nuclear fuel can be substituted for oil in electric power generation, thereby diminishing a country's dependence on the world oil market that has, for the near term at least, been effectively cartelized by OPEC; (2), nuclear power can be exploited in ways that will lead to the eventual development of a maximum degree of national nuclear self-sufficiency. However, in most national circumstances for the foreseeable future, nuclear independence could be achieved only if industry in the country involved were able to acquire and operate sophisticated fuel cycle technologies and if Government were willing to pay a very large ecenomic penalty.

Nuclear power can result in a nuclear weapon option in a large number of ways. The basic requirement is the availability in the country concerned of plutonium or high-enriched uranium. Beyond 1980, the annual plutonium output from nuclear power programs throughout the world will increase rapidly to hundreds of thousands of kilograms and eventually reach millions of kilograms, assuming nuclear power forecasts are fulfilled. Yet 5 kilograms, or less, of plutonium is enough for a bomb capable of destroying a medium-sized city. Therefore, one of the most challenging energy policy issues is how to manage over the longrun inherent risks of nuclear weapon proliferation. The risks are twofold: diversion of materials from nuclear power industries by governments; and theft of materials by criminals or terrorists. The widespread use of nuclear power must not lead to widespread nuclear violence.

It is important to understand that the pursuit of self-sufficiency in a nuclear power program leads inevitably to the creation of a nuclear weapon option. At the same time, nuclear self-sufficiency reduces external political constraints which might inhibit a government in exercising that option. Thus, one nation's pursuit of nuclear energy self-sufficiency may well appear provocative to another.

As of January 1975, over 360,000 megawatts of nuclear power capacity was operable, under construction or on order worldwide (see table 1). This figure reflects most of the slippage that has occurred since the 1973–74 OPEC oil price revolution. Whereas 15 countries now have operable nuclear power reactors, 30 countries will have them in 1980. Therefore, the issue is not whether we have nuclear power, but how we manage it.

While politically irreversible commitments to nuclear power have been made in a number of countries, the essential nuclear fuel cycle support facilities—uranium enrichment, irradiated fuel reprocessing, and fuel fabrication—remains to be worked out. The pattern that evolves will be critical in determining whether nuclear power develops worldwide in an economically efficient way and in a way in which the inherent security risks are effectively managed. A central fact in this regard is that economic efficiency and international security considerations work together, not at cross purposes.

One pattern of nuclear power development would occur if national governments were to aim for nuclear efficiency and security. If these criteria were applied, the nuclear-electric power growth rate would be determined by particular national economic circumstances. Many nations would have nuclear power reactors on their territories. However, economies of scale in fuel cycle operations would be fully exploited. Large-scale uranium enrichment, irradiated fuel reprocessing and fuel fabrication plants would be built in a relatively few locations. These facilities would be large enough to meet the needs of nuclear power plants throughout an entire region of the world. The facilities would be multinationally owned and operated and subject to international inspection by the International Atomic Energy Agency.

Each nation participating in such multinational nuclear enterprises would receive the benefits of an assured supply of nuclear fuel at least cost. The burden of putting up the capital required for the venture could be spread proportionately among the participants according to their entitlements to the output of the facility concerned.

The civilian nuclear power posture of the participating nations would not appear provocative to each other or to countries outside the region. Finally, effective physical security against theft of nuclear fuel could be maintained. Transport of materials in a form that could be used directly in nuclear explosives could be eliminated by relocation of fuel cycle facilities, and strong physical security measures could be incorporated into the design and operation of such centralized facilities.

The alternative pattern of nuclear power development would emerge if national governments were to aim for nuclear power independence. Each nation would, as rapidly as feasible, acquire its own capabilities in uranium enrichment and/or fuel reprocessing and fuel fabrication. In most circumstances, these capabilities would not be efficient according to commercial criteria, but they could nevertheless provide the nation concerned with part or all of its nuclear fuel requirements.

A nation with its own small uranium enrichment capability could produce low-enriched uranium for use in its reactors and/or high-enriched uranium for use in explosives. A nation with its own fuel-reprocessing plant would have control over plutonium that could be recycled in power reactors and/or used in nuclear explosives. Thus one country's nuclear power independence may threaten another's security, turning the latter into an inefficient and insecure path of nuclear-power development itself.

Furthermore, if nuclear power were to develop along such nationalistic lines, materials that could be used directly in nuclear weapons would be widely dispersed in a large number of countries. The problem of safeguards against theft and terrorist use of crude nuclear explosives would then be much more difficult, perhaps impossible, to manage. The presence of large quantities of plutonium or high-enriched uranium in a country could also add a new, frightening dimension to any domestic political revolution or civil war.

Which pattern of nuclear power development will become prevalent—economic efficiency and international security, or economic nationalism and global insecurity? So far, the evidence is conflicting. Plans for future uranium enrichment ventures—whether using the diffusion or centrifuge method—are being formulated mostly on a multinational basis. This includes British/Dutch/West German cooperation in the development of the centrifuge with URENCO and the French-led Eurodif project based on gaseous diffusion. However, South Africa is pressing ahead with construction of its own enrichment capability based on an undisclosed process. A number of countries, including India, have build small chemical reprocessing plants, and larger national facilities are planned in several industrial countries. However, the Eurochemic plant in Belgium, which is now shut down, provides a precedent for multinational ownership and operation of such a facility. Plutonium recycle has not yet begun on a commercial scale in any country. The decision whether to take this critical step in the development of nuclear power, and, if so, on what terms, is now pending in the United States and also in Europe.

In my judgment, the tendencies toward nuclear power development along primarily nationalistic lines are likely to prevail in many countries, if not most. But these tendencies are not yet irreversible, unlike the basic underlying trend toward nuclear power. However, to reverse the trends toward nuclear nationalism and resulting economic inefficiency and political insecurity will require strong and concerted governmental action.

With this background in mind, let me turn to the specific provisions of S. 1439. In general, the bill seeks to make the U.S. governmental structure for nuclear export regulation more rational than at present. Moreover, the bill suggests certain lines of policy development. I will limit myself to a few important points.

The bill would centralize authority to grant nuclear export licenses in the Department of Commerce. However, it is unclear whether the Commerce Department is intended to play a primarily ministerial role in granting nuclear export licenses, once the other agencies specified have made their assigned assignments, reviews and findings, or whether the Department is intended to play a more substantive role in determining whether proposed nuclear exports are, on balance, in the national interest. If the latter is the intent, the legislation should provide explicit criteria to guide the Commerce Department in its licensing decisions.

The bill would give the Nuclear Regulatory Commission [NRC] a key role to play in the nuclear export field. Experts would require a finding of "safeguards" in the recipient country "substantially at least comparable to" U.S. safeguards. I believe such a finding of comparability or equivalence should be part of U.S. nuclear export policy. Nevertheless, it should be recognized that, if taken seriously, the process of making such a finding would be a delicate and difficult task. A recipient country might well view such a requirement as an unwarranted intrusion into a particularly sensitive aspect of its internal affairs; namely, its domestic security arrangements.

An alternative approach would be to negotiate an international agreement providing physical security standards and procedures potentially applicable to nuclear power industries worldwide. This has been proposed by the IAEA Director General and the U.S. Government. The proposal should be pursued. If a satisfactory international agreement could be worked out, including provision for verification of its observance, then the role of the NRC under section 7(a) of S. 1439 could be limited to posisble U.S. nuclear exports to countries that had not joined the international nuclear materials security convention.

Furthermore, under section 8(a) of S. 1439, the NRC would be required to prepare a "nuclear proliferation assessment" regarding nuclear exports that would be deemed "strategically significant," and the Arms Control and Disarmament Agency [ACDA] would have an opportunity to comment on the assessment. Presumably most substantial exports would be deemed strategically significant.

However, NRC would not seem to be in the best position to make such a nuclear proliferation assessment since its primary mission is to regulate the domestic U.S. nuclear power industry from the viewpoint of health and safety and physical security against theft and sabotage. The connection of NRC to the network of Federal agencies dealing with national security and foreign policy matters is much more tenuous than was formerly the case with the Atomic Energy Commission (AEC). However, ACDA is charged by statute at least with responsibility for U.S. arms-control policy formulation, including U.S. policy regarding nuclear weapon nonproliferation. Therefore, instead an NRC assessment, ACDA might, on request from NRC, prepare and circulate the nuclear proliferation assessment which could then be taken into account by the NRC is making a safeguards finding under section 7(a), or by the Department of Commerce in its decision to grant or deny final approval of a nuclear export license.

It is also unclear to me what effect the proliferation assessment would have on the government decisionmaking process. Presumably, the results would be classified. It might be appropriate to require that the assessments be made available to the appropriate oversight committees of the Congress, as well as all executive agencies and departments represented on the National Security Council, if broad review and participation in these decisions were desired.

An important matter that is unclear to me from my reading of the bill is the status of toll enrichment services. Would the bill apply to foreign owned uranium shipped to the U.S. for toll enrichment that was thereafter shipped abroad for fabrication into nuclear fuel?

S. 1439 would also require the NRC to make two safeguards studies: one would examine the IAEA system and the U.S. system; the other would investigate the feasibility of "internationalization of all strategically significant aspects" of the civilian nuclear fuel cycle.

The safeguards study would be unlikely to reveal much in the way of fresh understanding, since this matter has already been periodically covered by the former AEC and the IAEA. Obviously, the primary objectives of the two kinds of safeguards are radically different: the U.S. system is intended to prevent theft by a criminal or terrorist group, and the IAEA system is designed to detect diversion by a national government in violation of an international agreement. Moreover, the primary means used to carry out these disparate objectives are consequently very different: the U.S. system uses primarily a combination of physical barriers and security forces, and, secondarily, a system of materials accountancy, while the IAEA system uses primarily materials accountancy, based on national systems, and limited verification through international inspection.

The initial study of the feasibility of internationalization of nuclear fuel cycle facilities was made in 1945–46 in the Acheson-Lilienthal Report. That historic report concluded that nuclear power must be developed under a strong international authority with pervasive licensing control over all phases of the civilian nuclear fuel cycle from the mine to the radioactive waste management facility. These conclusions formed the basis for the Baruch plan presented by the U.S. Government to the United Nations in 1946. Internationalization is technically feasible and economically desirable. The political will is missing, however.

I believe the time for study of this matter has past, and the time for action has arrived. Accordingly, I would like to conclude this statement with some specific suggestions regarding the substance of U.S. nuclear power export policy. Some of these might be incorporated into S. 1439, while others might form the basis for United States foreign policy initiatives.

First: The United States could offer to provide its most advanced uranium enrichment technology for large enrichment facilities that would be built outside the United States under multinational ownership and IAEA safeguards. Such an offer was extended in 1971 and again as part of the international energy problem growing out of the Washington Energy Conference in 1974. It must be pursued with urgency as part of a broader effort to encourage the multinational ownership and operation of chemical reprocessing, fuel fabrication and associated nuclear material storage facilities.

Second: In addition to the requirements for IAEA safeguards under the NPT or under U.S. agreements for cooperation with countries not parties to the NPT, the United States could adopt the following nuclear export policy:

(*a*) Low-enriched uranium LWR fuel: Nuclear fuel containing low-enriched uranium produced in U.S. enrichment facilities for use in power reactors in foreign countries would be reprocessed either in U.S. facilities or in facilities multinationally owned and under IAEA safeguards. Plutonium recovered from reprocessing would be stored until fabricated and fabricated into complete fuel assemblies in a fuel fabrication facility on the same site as the reprocessing facility.

(*b*) High-enriched uranium HTGR fuel: High-enriched uranium produced in U.S. enrichment facilities for use in power reactors in foreign countries would be fabricated into complete fuel assemblies in the United States and reprocessed either in U.S. facilities or in facilities multinationally owned and under IAEA safeguards. Restrictions comparable to recovered plutonium would apply to recovered uranium-233.

(*c*) Power reactors: The same restrictions would apply to fuel used and produced in foreign power reactors exported from the United States, or incorporating major components exported from the United States, as to fuel enriched in the United States.

(*d*) Nuclear material exports for nuclear power R. & D.: U.S. exports of high-enriched uranium or plutonium for use in foreign nuclear power research and development activities would be subject to specially negotiated conditions as to safeguards during use.

(*e*) International safeguards against governmental diversion: Article III, paragraph 2 of the NPT would apply.

(*f*) National safeguards against nongovernmental diversion or sabotage: U.S. exports of nuclear materials and equipment would be subject to a requirement that they be protected in the recipient country and any third country to which they may be transferred by physical security measures designed to give at least the level of protection afforded similar materials and equipment in the United States.

The above policy suggestions do not differentiate between nuclear-weapon and nonnuclear-weapon countries, or between parties and nonparties to the NPT. The absence of discrimination may be viewed as an advantage, but it may nevertheless introduce complications.

Such a U.S. policy would not succeed unless other countries develop a common view of nuclear power interdependence as being in their own long run economic and security interests. The nonnuclear-weapon countries must seize the present opportunity they have now—but not for long—to develop nuclear power on the basis of interdependence instead of self-sufficiency. The major industrial countries of Western Europe and Japan, the resource rich nonindustrial countries, and the less developed countries need not be dependent upon the United States or the Soviet Union. Instead, they can develop cooperation among themselves. This is the kind of interdependence that will be most important.

In the nuclear era, it is clear from an economic viewpoint, and even more from a security viewpoint, that the interests of nations are becoming increasingly interwoven into an interdependent world.

Senator GLENN. Thank you very much. It is an excellent statement.

I would like to ask a few questions here as rapidly as we can, with time passing by. The promise we would end by 1 o'clock was made to all of the panelists who are here this morning.

Would you comment, Mr. O'Leary, with regard to NRC's export licensing being largely a ministerial-type function, did you ever consider withholding such a license when you were in the AEC? If not, why not? Why was it just a rubber stamp operation?

Mr. O'LEARY. My deputy, who was in charge of this, once or on two occasions discussed the possibility of withholding a license.

We never really saw one that came through that presented a sufficient issue, although we were prepared to do so.

Senator GLENN. I see.

Mr. O'LEARY. We would have to see one that was a good clear test case, one such as without any safeguards, and highly vulnerable composition, for example, the South African movement would have been an excellent one if they had not been a member of IAEA.

Senator GLENN. Well, South Africa, I think is still pretty well suspect.

We have a lot of information on it that has not even been read into the record here, and I will not take the time, but they apparently have asked for far more material than necessary to run the nuclear facility that they have indicated they need it for—up to some eight times the amount of material.

Over the past 10 years, we have exported about 200 pounds of 90 percent enriched uranium in the form of fuel elements to them for use in their Safari I research reactor. Some 100 pounds of this is currently in South Africa, even though the reactor requires only 30 pounds for refueling each year, and that leaves a surplus of 70 pounds or enough for five nuclear weapons.

In addition, a U.S. fuel supplier at Oak Ridge has two more orders from them now, I understand, for fuel elements totaling 56 pounds of highly enriched uranium, and it anticipates a third order, for a total of enough for eight nuclear weapons.

I tend to agree with your statement that that is one that would have been highly suspect. Would you have held that up, or would you have passed on any of these orders?

Mr. O'LEARY. I think some of these orders were passed on during my presence, but they were not brought to my attention.

One of the remarks I want to make, Senator, is that the regulatory staff, the one that has the responsibility for issuing the licenses, never really looked into it.

They did not have the intelligence, they did not have the contacts. They were at the end of a long chain, that began perhaps with the Department of State, perhaps with the Germantown side of the AEC operation, and they were purely and classically ministerial.

Senator GLENN. Would you say that business interests overcame what might have been our best international security interests?

Mr. O'Leary. I think the vested interests, promotional interests, have tended over the formidable length of this particular chain I described, to dominate the system.

Senator Glenn. Do we have access to all of the specific terms of subsidiary agreements, and arrangements that IAEA makes?

When we are saying that we are relying on IAEA to do some of the investigation for us—and South Africa has IAEA membership—do we have access, and do we perform any function in determining what the IAEA criteria are?

Mr. O'Leary. No, I think we do not. I know that Mr. Page from the NRC is in the audience. He has been the delegate to IAEA, and he can better comment on that.

Senator Glenn. It would appear this is a blank check, a blank check confidence, we have given to the IAEA without really knowing what they are doing.

Mr. O'Leary. Let me give you another measure of the degree to which the regulatory staff looked at this.

Our entire investment in the export licensing process, was one-half man-year. We did not look at it. We did not have cognizance of the sorts of arrangements that were behind the transactions. We did not participate in the development of the transactions. We came in at the end of the chain and simply issued the license.

Senator Glenn. Either of you other gentlemen may have comments on this. Do you have any comments on what we have been discussing here?

Mr. Rosenbaum. I think the pertinent questions about organizations like the IAEA are: How do they go about finding information which might lead them to suspect diversion? What would they do if they found such information? How would we find out about it?

There is a story that might suggest some possible answers to these questions with regard to the IAEA. It is a story I cannot verify from personal knowledge, but I believe it is true. You might want to ask some of the witnesses from ERDA, or NRC, about it. I tell it because I think it is indicative of a problem, not because I want to emphasize this particular example.

The United States has two 250 megawatt General Electric power reactors in Tarapur, India, which are under IAEA safeguards. They have been running more than 5 years.

It is very difficult to know how much plutonium has been made in a reactor over a period of several years unless you know at what power levels the reactor has been running.

That is to say, if you want to find out whether all of the plutonium made in a reactor is still there after the fuel has been reprocessed, you need to know at what power levels the reactor has been run. Otherwise there is a large uncertainty in the estimate of how much plutonium has been made.

The story I have heard is that a Yugoslavian IAEA inspector named T. Dragnev went to India to inspect the Tarapur reactors in the fall of 1973. He brought with him a new technique which, using high resolution gamma spectroscopy, would have enabled him to closely estimate how much plutonium had been made in these reactors.

This technique, I believe, was given to the IAEA by the United States, and taught to this inspector by a U.S. scientist at the IAEA.

My understanding of what happened is that, when Mr. Dragnev told the Indian engineers what he was doing, they confiscated the magnetic tape on which the data was recorded. Thus, even if the Indians were diverting plutonium from our reactors, we might not have known it. Even if the plutonium for their bomb did not come from the Canadian reactor, but from ours, we would not be very sure of it. The sort of measurements which might have given us some way of knowing, the Indians confiscated.

What were the penalties for confiscating it? Nothing. What was done about this suspicious act? As far as I can tell, nothing was done. Was any report made to the U.S. Government? I don't think so. Again, I do not have personal knowledge of this.

Senator GLENN. You have done a lot of study in this area, and I believe you were commissioned to do one of your studies in the safeguards area a year or so ago by Mr. O'Leary. Do you think the major problem we should be protecting against is terrorist activities, that is, preventing the theft of plutonium within a country, as opposed to trying to control all plutonium in the country to prevent diversion by the country itself?

So the question is, should it be government to government cooperation to the extent that we trust that governments will not indiscriminately start throwing atomic bombs around, with the understanding that they themselves will be interested in keeping internal control of what could be a terrorist situation. Could we get more cooperation that way?

Mr. ROSENBAUM. Yes, sir, I feel very deeply that the national proliferation situation is largely out of our control.

There are many countries in the world who feel that their existence is threatened by armed forces on their borders and who have the capability to make nuclear weapons. I believe they will make them for exactly the reason we made them ourselves, for deterrence. The nonproliferation treaty, for example does not prevent a country from making the elements that go into a weapon. Such a country can withdraw from the treaty and then put the weapons together in a short time.

Senator GLENN. You are talking about comparable safeguards. Is it not true that we use different licensing criteria for exports than we do for domestic use, and, if so, why, why do not comparable safeguards criteria apply to begin with?

Mr. O'LEARY. The comparability would run this way. At the moment, we do not require on an export that the importing country have safeguards, for example physical security, safeguards that are comparable to ours. We are developing a fairly effective system in the United States.

The thrust of the bill is to assure that when the material leaves our borders, as it goes over, let us say into one of the adjacent States, it is similarly safeguarded.

Mr. WILLRICH. Could I comment on that point?

Senator GLENN. Briefly, as my 10 minutes have passed.

Mr. WILLRICH. Very briefly, we are developing in this country safeguards applicable to our industry, but we have come very lately to focusing on this problem, and I do not think that the United States has yet sorted out its own priorities in terms of the internal arrangements we are going to have here.

There are major decisions pending before the Nuclear Regulatory Commission, and before the industry as a whole, in terms of how it is going to manage its domestic safeguards program. The United States has an enormous nuclear power capacity operable, and coming on line.

What we do will make a difference in the world. I would suggest we put our own house in order. At the same time, I think our decisions are linked to the world situation. There is interdependence of fuel cycle elements. The problem is to realize the deficiencies and move forward in a sensible way.

Senator Glenn. The Senator from Illinois.

Senator Percy. Mr. O'Leary, I have been constantly surprised, and particularly on returning recently from the Mideast, at the way we have proliferated the sale, or gift of weapons all over the world, sophisticated conventional weapons, without a real clear-cut policy as to what effect this will have.

I assume that our controls are much tighter, for weapons, and weapon potential that has unlimited capability, such as in the nuclear field, and therefore I am rather shocked with the procedure that you outlined for licensing so-called normal commercial nuclear export transactions. That this Government could so casually approve the export of weapons-grade material is really beyond comprehension.

Is it true that NRC has the responsibility for issuing the export license, but it has no, or relatively limited internal capability for making independent judgments on the purchasing country's actual compliance with the IAEA materials accountability safeguards?

Mr. O'Leary. I think that is a fair summation. I do not know precisely what the situation is now. When I left that organization at the end of last June, the regulatory staff had essentially no capability to do other than process paper.

Now, that is not to say that the entire Atomic Energy Commission was not doing something in this area, because under the international programs, under the general manager, I am quite sure that there was a look. But the point to emphasize here is that we in the regulatory staff were in fact the ones that were conducting the act, we were stamping the export licenses, and simply because of the history of this business, and I must say that it went beyond that, it ran to the entire problem of safeguards.

There was a clear separation between responsibility and authority, that is really the point you have to focus on, the authority was in a number of agencies, and it was simply diffused all over the place.

Senator Percy. Is it true that the R. & D. side of the former AEC, not only had the research and development responsibility, but also were tied in with the responsibility to promote the use of energy?

Mr. O'Leary. Of course.

Senator Percy. Now that EDRA has been created by this committee, is it true that it has not only the research and development, but it is the promotional agency? And is it accurate therefore that they not only are the promotional agency, but they are relied upon to make the key decision to issue licenses?

Mr. O'Leary. Let me answer that.

Senator Percy. It sort of reminds me of having a factory where you have the quality control, and you also tie it up with your sales effort. You are constantly trying to choose which is the more important, and, at times, the pressures get very great to get more sales.

Senator Glenn. Before you answer, could I interrup.

Senator Percy, I will step out to vote in order that the hearings may continue, and after I return you can step out.

Senator Percy. Fine.

Mr. O'Leary. Senator Percy, I think it is fair to say, and as a matter of fact I have said it on some occasions, that after a while, and not because of any finality, simply because of an almost evangelical fervor on the part of the Commission, the Commission and the industry became inseparable.

You really could not see the difference. There was a general awareness of this unity of purpose that should have existed, and really there ought to be a segregation of research promotional side from the regulatory side.

I think we are really talking about some unfinished business here in that area.

Let me go back to Mr. Willrich's statement earlier about the decisions with regard to the fuel cycle. In fact, the Atomic Energy Commission has looked upon the whole nuclear business as simply another sort of technology that is directly competitive with coal, oil, or natural gas, and can go anywhere that coal, oil, or natural gas can go.

The fact is that we realize now the hazards of nonlocation, but colocation raises some very, very severe institution problems.

Who gets in bed with whom, for example, in the facility?

What are the relationships, the physical relationships between these corporations? Is it a nationalized thing, or can we continue to have a private sector corporation working this.

This is part of a whole series of questions that the old Commission was simply unwilling to tackle, they were unwilling to deal with.

Now, we are getting to the point where our inability to deal with these problems is really addressing the hole process, and we have to find ways, other ways to do things, otherwise we are going to short circuit the entire nuclear thing, not only here, but abroad, and we must treat nuclear force as a very hazardous technology, but a very desirable technology.

Senator Percy. If we can concur that it should be segregated from the safeguard element, do you agree this responsibility should be removed from ERDA, and that the NRC should be required to make its own independent judgments about the national interests and safety aspects of the proposed nuclear exploits?

Mr. O'Leary. I think that NRC is not properly constituted to become a part of the total decision here of what is in the public interest, what is in the short-term political interests of the United States.

In my view, this bill is well expressed in that NRC ought to look at the safeguard situation, and say if you look to do this, for other reasons, it is all right, or it is not all right from the standpoint of this vital element of the safeguards problem.

Senator Percy. Then you would concur with the bill?

Mr. O'Leary. In those features, yes.

Senator PERCY. In that bill?

Mr. O'LEARY. Yes.

Senator PERCY. Thank you very much, and I appreciate your statement. In fact, all three statements are extraordinarily good.

Dr. Rosenbaum, you are an acknowledged expert in this field, and we are grateful for your being here, particularly in the field of safeguards.

As we are familiar, we are all familiar with the scenario of terrorist threats to entire cities based on the ability to build and deliver so-called homemade nuclear devices, how real in your judgment is this threat, how serious should we take the threat?

Dr. ROSENBAUM. I think it is a very serious threat. I do not know quite how to answer the question of how serious it is. It certainly is possible. There are thousands and thousands of people in this country, outside the Government, who have the capability, in small groups, to make weapons out of plutonium, or highly enriched uranium.

There are thousands and thousands of people outside the United States, and not in governments, who have similar capability.

The borders of the United States are virtually open, as we see by the enormous number of illegal Mexican immigrants who come in, as we see from the difficulty of controlling drug traffic into the country.

I cannot conceive that we want to do the sorts of things that close borders, things such as East Germany does. Therefore, I assume our very long borders will continue to be essentially open, and all of this presents a very serious threat indeed.

Senator GLENN. Thank you very much, Mr. O'Leary, Mr. Rosenbaum, and Mr. Willrich. I think you stated a very good case for internationalizing uranium enrichment and reprocessing of spent fuel. I think you have presented your statements with great persuasiveness.

Mr. Willrich, in your statement on page 9, you said that the political will is missing, and on page 10, you state that this goal—internationalizing the nuclear fuel cycle—has not been pursued with urgency by government. Can you give us the reasons why you think this is true?

Mr. WILLRICH. Well, there is a long answer and a short answer obviously to a question like that, but it is not a question of putting blame on some particular part of the Government.

The history that Dr. Ikle gave earlier this morning indicates that dedicated people have been at work on a lot of these problems for decades, and not just recently.

We live in a very decentralized political structure in the world. The United States does not have its way entirely, and we are learning that more and more. It is very difficult for us to make decisions in this country to solve these institutional problems, which Mr. O'Leary was touching on, and the burden of my thought here would be, combining the issue of weapons proliferation with the energy situation, it really is time to recognize the important decisions. For example, there are other things in the ERDA split from NRC that are loose ends, so to speak. The largest program in ERDA, budgetarily speaking, is the manufacture of nuclear weapons. Some years ago, a very large amount, several hundred kilograms of plutonium were exported by the United States to West Germany, and other very large amounts to Japan.

Now, this was well before any of these problems we are talking about here today, sort of crept to the surface.

Those export sales, I believe, were very carefully looked at, from the standpoint of what kind of arrangements would be applied on both ends, because obviously people recognize that that amount of material was very significant from the standpoint of the recipient.

It is not so much organization, Senator Percy, as it is substance and policy, and the kind of policies that are applied, and I would encourage you in looking at this bill, to look at it as a vehicle, not to just reorganize and to take out what is in ERDA now and destabilize what has already been stabilized, but to really make some decisions here where they ought to be made, in terms of specific policies that the U.S. Government ought to follow, in this area, and not to simply reorganize with a broad delegation of power handing the problem off to some new or old Government agency. The Congress needs to make some of these decisions, and there is a whole range of things where the Congress needs to make decisions.

On the export issue, the United States has to decide what is our national interest.

Senator PERCY. I will have to go over and vote.

One last question on that very point. Do you think these hearings should be a spur to international negotiations, so that we can accelerate the speed with which we are moving on this, and point up the necessity for it?

Mr. WILLRICH. I think that is the essential purpose of these hearings, you must eventually legislate, but also you can ventilate the substance of the issues to get that legislation.

Senator PERCY. I will ask unanimous consent of the committee, that the remainder of my prepared questions be submitted for the record, though when the chairman returns, if he would like to ask them, I would have him do so. I ask the staff to bring that to his attention.

We will have to recess for a short time while I vote.

[The prepared statements of John O'Leary, Dr. David M. Rosenbaum and Professor Mason Willrich follow:]

STATEMENT OF JOHN F. O'LEARY

Mister Chairman, Members of the Committee. My name is John F. O'Leary. I served from June, 1972, through June, 1974, as Director of Licensing of the Atomic Energy Commission. In that capacity I was responsible for licensing of nuclear-related exports. My task today is to describe for you the role of the Atomic Energy Commission, which is essentially identical to that of the Nuclear Regulatory Commission, in granting licenses for export of nuclear reactors and similar facilities and of special nuclear material (SNM).

The Committee should note that the responsibility for approval of nuclear-related exports is difused. We can identify several broad categories of export that are potentially of significance from the standpoint of safeguards and of nuclear proliferation. These would include exports of technology in the form of blueprints, designs and design concepts, etc; the export of sub-components for reactors and for fuel reprocessing and fuel fabrication facilities; the export of "user facilities," that is to say, of facilities with a direct capability of utilizing nuclear material -- principally reactors; and the export of special nuclear material -- that is of fissile material capable of being fabricated into a fission bomb. Exports of the first category -- technology -- are controlled by ERDA. Exports of the second -- sub-components -- are controlled, to the extent that they are controlled at all, by Commerce. Exports of the third and fourth categories --

user facilities and special nuclear material -- are nominally controlled by NRC but in fact are controlled, by ERDA.

The Committee can obtain insight into the licensing process by tracking through two export licenses -- the first involving a normal commercial transaction and the second a transaction that was negotiated at the policy level of the United States government.

In the first case, a foreign purchaser (perhaps a government laboratory or a university) might wish to have, for example, special nuclear material in the form of highly enriched or weapons grade uranium for use in an experimental reactor. The foreign entity would contact an American firm in the business of selling the special nuclear material involved. The United States firm, in turn, would make application for an export license to NRC. NRC would then consult with ERDA to determine whether or not there was a cooperative agreement between the United States and the importing country was a participant in the safeguards program of the International Atomic Energy Agency. If the advice from ERDA is affirmative on either point, the license would be issued automatically.

A second example would involve the offer of the sale of one or more nuclear reactors to a government of a nation who was not a signatory of the Nuclear Proliferation Treaty by a high official of our government, for example, the Secretary of State. Following on the offer, ERDA would conduct a negotiation with the potential importer and would ultimately work out a bilateral agreement on safeguards or an arrangement under which the importing country would subject itself to the safeguards provisions of IAEA. In the meantime, the potential importing nation would be conducting negotiations with a reactor manufacturer. On culmination of these negotiations, the manufacturer would apply to NRC for an export license and here again NRC would request the advice of ERDA with regard to the safeguards aspect of the license and if results were affirmative would issue the license.

In both examples, the point to note is that NRC acts in a purely ministerial capacity, that is to say, the licenses are issued after an affirmative finding by ERDA without the exercise of any judgment or discretion on the part of the NRC.

The Committee will also be interested in the safeguards philosophy that unlies the activity of the IAEA.

The sole objective of IAEA's formal safeguards program is to prevent illegal diversion by states. In furthering this objective the agency places total reliance on inventory controls for special nuclear material. It does not provide safeguards controls from the standpoint of physical security of special nuclear material and it is not primarily concerned with the prevention of theft of SNM. In discharging its international responsibilities the agency has a program consisting of five functional elements:

. It maintains a bluebook which sets forth general critieria to guide states in the development of their safeguards program.

. It receives complete descriptions from states of their nuclear production processing and using facilities together with a complete description of the inventory measurement system employed in the facility for safeguards purposes.

. It enters into detailed "subsidiary" agreements covering each facility that details a specific inventory control program applicable to that facility.

. It requires comprehensive reporting of transactions affecting inventories of SNM.

. It conducts international inspections to insure compliance with the terms of subsidiary agreements.

In addition, the agency provides guidance in the form of suggested criteria to states for the development of physical security programs, however, its role in the non-inventory aspects of safeguards is essentially advisory.

STATEMENT OF DAVID M. ROSENBAUM BEFORE THE SENATE COMMITTEE ON GOVERNMENT OPERATIONS ON APRIL 24, 1975

Mr. Chairman, an age of world politics is coming to an end. Our nation's hopes for a peaceful and free world after World War II were abruptly shattered when the Soviet Union colonized the eastern half of Europe, slaughtered or imprisoned all its non-Communist leaders, and imposed Communist dictatorships upon the people by the most ruthless sort of military and secret police brutality. An era which began with our national disillusionment with a policy based on wishful thinking is ending in the same manner.

This cold war era has been essentially a bipolar one dominated by our, until now largely successful, policy of containment of Communist expansion by military means. It was preceded by the collapse of our policy of trading real gains for the Communists, namely substantial territorial acquisitions, for paper agreements, such as Yalta, which the Communists ignored. The same sort of wishful thinking has characterized our recent foreign policy and has partly brought about our present situation in the world. Vietnam, Cambodia, and Laos, in which we have expended so much blood and treasure, will soon be entirely Communist. Greece and Turkey, traditionally both our allies, are now both hostile. Portugal is very close to being openly Communist. All over the world governments are publicly questioning what benefits and security are to be had from being a friend of the United States. Most of them are liable to come to the conclusion that the answer is, "not much".

I do not mean to suggest by this that most of these countries will turn Communist. I do mean to suggest, however, that countries which perceive an immediate military threat to their existence, or even a potential long range threat, are likely to develop nuclear weapons capabilities for precisely the same reason that we have done so: to provide a deterrent. I think that the proliferation of nuclear weapons among the nations of the world is inevitable. It is inevitable because the technology and materials necessary to make nuclear weapons are already available in many countries of the world and many of these countries will perceive it to be in their national interest to develop such weapons.

The questions we must ask ourselves now are the following. In what ways would we like to influence the course of nuclear proliferation? How much is it in our power to influence the course of nuclear proliferation? What effects on our other internal and external national goals will different policies toward nuclear proliferation have?

The proliferation of nuclear weapons among middle-sized nations may not be an unmitigated evil. Possession of nuclear weapons by these countries may substantially lessen the frequency of warfare between them and the total number of people killed per year may not be any greater than the world is currently experiencing with its constant series of brutal little wars around the world. It is difficult, on the other hand, to think of possession of nuclear weapons by sub-national terrorist groups as anything but an unmitigated evil. While nations have a territory which may be retaliated against, terrorist groups, by their nature, have none. I believe, therefore, that whatever influence we can bring to bear on the proliferation of nuclear weapons in the world should be largely expended in an effort to keep nuclear weapons and the materials to make them out of the hands of sub-national groups. This is a goal we can share with virtually every other nation of the world and, in particular, with the Soviet Union.

It cannot go unnoticed in the Soviet Union that the last two countries to acquire nuclear weapons, China and India, lie along her southern border. Other potential candidates for nuclear weapons development also lie along the southern border of the Soviet Union. The Soviet Union is made up of many different cultural groups and nationalities and many of the smaller groups which lie along her southern border share a cultural identity with groups on the other side of the border. Many of these groups have legitimate grievances against their treatment by the Soviet Union. I feel, therefore, that this is one area in which we might expect honest and full hearted cooperation from the Soviets.

I believe that proliferation of nuclear weapons among national and perhaps some sub-national groups will be the dominant political reality by the end of the century. Pandora's box has been opened and there is no way to put the evils back inside. It is vital that we face this fact and use whatever influence we have not merely to delay the process a little bit longer, but to modify it in whatever ways we believe most beneficial to our nation and the world.

I have, Mr. Chairman, two general comments and a number of specific suggestions about the Export Reorganization Act of 1975.

First of all, while I support an expanded, better financed, and better staffed IAEA, I believe the bill should be largely oriented toward trying to keep nuclear weapons and the materials to make them out of the hands of sub-national groups, rather than stopping the proliferation of nuclear weapons among nations. Secondly, I believe the bill should deal only with those quantities of material and types of equipment which pose a safeguards danger. In particular, I believe that section 3(1) should be modified to exclude quantities of special nuclear material, source material, and by-product material too small to have any safeguard significance.

I would like to make the following other specific suggestions, Mr. Chairman, for modifications in the wording of the act. With regard to section 2(a)(6) and section 7(a), I suggest first of all that the wording be changed from "substantially at least comparable," to, "at least equivalent to." Secondly, I would like to point out that our internal safeguards are not designed to keep the United States government from acquiring special nuclear material. Safeguards equivalent to ours would, thus, not be designed to keep governments from acquiring special nuclear material from their own facilities.

The "internationalization of all strategically significant aspects of the non-military nuclear fuel cycle," mentioned in section 2(a)(8) and in section 9(b)(1) may not increase safeguards security. I ask, Mr. Chairman, where would such facilities be put? Who would staff them? Who would have the authority to police them? I think, Mr. Chairman, that it is often worse to have a structure which gives one a false assurance of safety than to have no structure at all.

I suggest, Mr. Chairman, that section 3(6) should be changed to read "'safeguards,' means any action to make diversion more difficult," Spiking plutonium with cobalt 60, for example, Mr. Chairman, does not seem to be included under the present definition of section 3(6).

I suggest, Mr. Chairman, that a section 4(a)(3) be added reading as follows. "No export license for arms, ammunition, and the implements of war including technical data relating thereto can be issued by the Secretary unless the Secretary of Defense has given written approval for the issuance of such a license." I suggest also, Mr. Chairman, that the act include authority for the Secretary of Defense to waive as much of this authority as he deems necessary.

I suggest, Mr. Chairman, there be added a section 7(c)(3) that reads as follows. "The Commission shall make available to other nations the most advanced special monitoring and protective devices developed for safeguards purposes, consistent with national security interests of the United States."

Last of all, Mr. Chairman, I suggest that section 8(a) be dropped altogether. I believe that the necessary national purposes will be covered by section 8(b). The nuclear proliferation assessment statement called for in section 8(a) seems to me to be so vague that it is liable to lead to still more delay in the administrative machinery of our government and to still further clogging up of our courts.

That is the end of my prepared statement, Mr. Chairman. Thank you very much for the opportunity to testify.

TESTIMONY OF MASON WILLRICH

Professor of Law
University of Virginia

Before the U.S. Senate Committee on Government Operations on the Export Reorganization Act of 1975 (S. 1439).

April 24, 1975

MASON WILLRICH: RESUME

MASON WILLRICH is professor of law at the University of Virginia. He was Assistant General Counsel of the U.S. Arms Control Agency from 1962 to 1965. Prior to 1962 he was in private law practice in San Francisco. Mr. Willrich has served as consultant to the Ford Foundation, the RAND Corporation, the U.S. Arms Control and Disarmament Agency, and various private companies.

Mr. Willrich's latest book is Energy and World Politics. His other publications include Nuclear Theft: Risks and Safeguards (co-authored with Theodore B. Taylor); SALT: The Moscow Agreements and Beyond; Global Politics of Nuclear Energy and numerous articles concerning energy matters and national security issues. Mr. Willrich graduated from Yale University in 1954 and received his law degree from the University of California, Berkeley, in 1960.

Mr. Chairman:

I welcome the opportunity to assist in your consideration of the Export Reorganization Act of 1975 (S. 1439). My testimony is limited to the parts of the bill that pertain to the export of non-military nuclear facilities, material and technology.

I will first outline the relevant trends in the development of a worldwide nuclear power industry. Next I will consider the provisions of S. 1439 in the context of U.S. government organization to develop and implement a nuclear export policy. Finally, I will outline some substantive suggestions for such a policy.

Given international political realities, there are a variety of motives for national governments to establish nuclear power programs. These include: low-cost electric power; increased energy security; and creation of a nuclear weapons option.

The economics of nuclear power were strengthened by the world oil price explosion in 1973/74. A compelling economic case for nuclear power can now be made in industrially advanced countries with relatively large electric power grids. Moreover, the current high oil price provides an economic rationale for smaller nuclear power reactors in a much larger number of countries with relatively small electric power grids.

Nuclear power can offer increased security of energy supply basically in two ways. First, nuclear fuel can be substituted for oil for electric power generation, thereby diminishing a country's dependence on the world oil market that has, for the near term at least, been effectively cartelized by OPEC. Second, nuclear power can be exploited in ways that will lead to the eventual development of a maximum degree of national nuclear self-sufficiency. However, in most national circumstances for the foreseeable future, nuclear independence could be achieved only if industry in the country involved were able to acquire and operate sophisticated fuel cycle technologies and if government were willing to pay a very large economic penalty.

Nuclear power can result in a nuclear weapon option in a large number of ways. The basic requirement is the availability in the country concerned of plutonium or high-enriched uranium. Beyond 1980, the annual plutonium output from nuclear power programs throughout the world will increase rapidly to hundreds of thousands of kilograms and eventually reach millions of kilograms, assuming nuclear power forecasts are fulfilled. Yet five kilograms, or less, of plutonium is enough for a bomb capable of destroying a medium-sized city. Therefore, one of the most challenging energy policy issues is how to manage over the long run the inherent risks of nuclear weapon proliferation. The risks are twofold: diversion of materials from nuclear power industries by governments; and theft of materials by criminals or terrorists. The widespread use of nuclear power must not lead to widespread nuclear violence.

It is important to understand that the pursuit of self-sufficiency in a nuclear power program leads inevitably to the creation of a nuclear weapon option. At the same time, nuclear self-sufficiency reduces external political constraints which might inhibit a government in exercising that option. Thus, one nation's pursuit of nuclear energy self-sufficiency may well appear provocative to another.

As of January 1975 over 360,000 megawatts of nuclear power capacity was operable, under construction or on order worldwide (see Table 1). This figure reflects most of the slippage that has occurred since the 1973/74 OPEC oil price revolution. Whereas 15 countries now have operable nuclear power reactors, 30 countries will have them in 1980. Therefore, the issue is not whether we have nuclear power, but how we manage it.

While politically irreversible commitments to nuclear power have been made in a number of countries, the basic pattern or structure for worldwide development of the essential nuclear fuel cycle support facilities--uranium enrichment, irradiated fuel reprocessing and fuel fabrication--remains to be worked out. The pattern that evolves will be critical in determining whether nuclear power develops worldwide in an economically efficient way and in a way in which the inherent security risks are effectively managed. A central fact in this regard is that economic efficiency and international security considerations work together, not at cross purposes.

One pattern of nuclear power development would occur if national governments were to aim for nuclear efficiency and security. If these criteria were applied, the nuclear-electric power growth rate would be determined by particular national economic circumstances. Many nations would have nuclear power reactors on their territories. However, economics of scale in fuel cycle operations would be fully exploited. Large-scale uranium enrichment, irradiated fuel reprocessing and fuel fabrication plants would be built in a relatively few locations. These facilities would be large enough to meet the needs of nuclear power plants throughout an entire region of the world. The facilities would be multinationally owned and operated and subject to international inspection by the International Atomic Energy Agency.

Each nation participating in such multinational nuclear enterprises would receive the benefits of an assured supply of nuclear fuel at least cost. The burden of putting up the capital required for the venture could be spread proportionately among the participants according to their entitlements to the output of the facility concerned.

The civilian nuclear power posture of the participating nations would not appear provocative to each other or to countries outside the region. Finally, effective physical security against theft of nuclear fuel could be maintained. Transport of materials that could be used directly in nuclear explosives could be eliminated by co-location of fuel cycle facilities, and strong physical security measures could be incorporated into the design and operation of such centralized facilities.

The alternative pattern of nuclear power development would emerge if national governments were to aim for nuclear power independence. Each nation would, as rapidly as feasible, acquire its own capabilities in uranium enrichment and/or fuel reprocessing and fuel fabrication. These capabilities would not be efficient according to commercial criteria, but they could nevertheless provide the nation concerned with part or all of its nuclear fuel requirements.

A nation with its own small uranium enrichment capability could produce low-enriched uranium for use in its reactors and/or high-enriched uranium for use in explosives. A nation with its own fuel reprocessing plant would have control over plutonium that could be recycled in power reactors and/or used in nuclear explosives. Thus one country's nuclear power independence may threaten another's security, turning the latter into an inefficient and insecure path of nuclear power development itself.

Furthermore, if nuclear power were to develop along such nationalistic lines, materials that could be used directly in nuclear weapons would be widely dispersed in a large number of countries. The problem of safeguards against theft and terrorist use of crude nuclear explosives would then be much more difficult, perhaps impossible, to manage. The presence of large quantities of plutonium or high-enriched uranium in a country could also add a new, frightening dimension to any domestic political revolution or civil war.

Which pattern of nuclear power development will become prevalent? -- economic efficiency and international security, or economic nationalism and global insecurity? So far, the evidence is conflicting. Plans for future uranium enrichment ventures -- whether using the diffusion or centrifuge method -- are being formulated mostly on a multinational basis. This includes British/Dutch/West German cooperation in the development of the centrifuge with URENCO and the French led Eurodif project based on gaseous diffusion. However, South Africa is pressing ahead with construction of its own enrichment capability based on an undisclosed process. A number of countries, including India, have built small chemical reprocessing plants, and larger national facilities are planned in several industrial countries. However, the Eurochemic plant in Belgium, which is now shut down, provides a precedent for multinational ownership and operation of such a facility. Plutonium recycle has not yet begun on a commercial scale in any country. The decision whether to take this critical step in the development of nuclear power, and, if so, on what terms, is now pending in the U.S. and also in Europe.

In my judgment, the tendencies toward nuclear power development along primarily nationalistic lines are likely to prevail in many countries, if not most. But these tendencies are not yet irreversible, unlike the basic underlying trend toward nuclear power. However, to reverse the trends toward nuclear nationalism and resulting economic inefficiency and political insecurity will require strong and concerted governmental action.

With this background in mind, let me turn to the specific provisions of S. 1439. In general, the bill seeks to make the U.S. governmental structure for nuclear export regulation more rational than at present. Moreover, the bill suggests certain lines of policy development. I will limit myself to a few important points.

The bill would centralize authority to grant nuclear export licenses in the Department of Commerce. However, it is unclear whether the Commerce Department is intended to play a primarily ministerial role in granting nuclear export licenses, once the other agencies specified have made their assigned assessments, reviews and findings, or whether the Department is intended to play a more substantive role in determining whether proposed nuclear exports are, on balance, in the national interest. If the latter is the intent, the legislation should provide explicit criteria to guide the Commerce Department in its licensing decisions.

The bill would give the Nuclear Regulatory Commission (NRC) a key role to play in the nuclear export field. Exports would require a finding of "safeguards" in the recipient country "substantially at least comparable to" U.S. safeguards. I believe such a finding of comparability or equivalence should be part of

U.S. nuclear export policy. Nevertheless, it should be recognized that, if taken seriously, the process of making such a finding would be a delicate and difficult task. A recipient country might well view such a requirement as an unwarranted intrusion into a particularly sensitive aspect of its internal affairs; namely, its domestic security arrangements.

An alternative approach would be to negotiate an international agreement providing physical security standards and procedures potentially applicable to nuclear power industries worldwide. This has been proposed by the IAEA Director General and the U.S. government. The proposal should be pursued. If a satisfactory international agreement could be worked out, including provision for verification of its observance, then the role of the NRC under section 7(a) of S. 1439 could be limited to possible U.S. nuclear exports to countries that had not joined the international nuclear materials security convention.

Furthermore, under section 8(a) of S. 1439, the NRC would be required to prepare a "nuclear proliferation assessment" regarding nuclear exports that would be deemed "strategically significant," and the Arms Control and Disarmament Agency (ACDA) would have an opportunity to comment on the assessment. Presumably most substantial exports would be deemed strategically significant.

However, NRC would not seem to be in the best position to make such a nuclear proliferation assessment since its primary mission is to regulate the U.S. nuclear power industry from the viewpoint of health and safety and physical security against theft and sabotage. The connection of NRC to the network of federal agencies dealing with national security and foreign policy matters is much more tenuous than was formerly the case with the Atomic Energy Commission (AEC). However, ACDA is charged by statute at least with responsibility for U.S. arms control policy formulation, including U.S. policy regarding nuclear weapon non-proliferation. Therefore, instead an NRC assessment, ACDA might, on request from NRC, prepare and circulate the nuclear proliferation assessment which could then be taken into account by the NRC in making a safeguards finding under section 7(a), or by the Department of Commerce in its decision to grant or deny final approval of a nuclear export license.

It is also unclear to me what effect the proliferation assessment would have on the government decision-making process. Presumably, the results would be classified. It might be appropriate to require that the assessments be made available to the appropriate oversight committees of the Congress, as well as all executive agencies and departments represented on the National Security Council, if broad review and participation in these decisions were desired.

An important matter that is unclear to me from my reading of the bill is the status of toll enrichment services. Would the bill apply to foreign owned uranium shipped to the U.S. for toll enrichment that was thereafter shipped abroad for fabrication into nuclear fuel?

S. 1439 would also require the NRC to make two safeguards studies: one would examine the IAEA system and the U.S. system; the other would investigate the feasibility of "internationalization of all strategically significant aspects" of the civilian nuclear fuel cycle.

The safeguards study would be unlikely to reveal much in the way of fresh understanding, since this matter has already been periodically covered by the former AEC and the IAEA. Obviously, the primary objectives of the two kinds of safeguards are radically different: the U.S. system is intended to prevent theft by a criminal or terrorist group, and the IAEA system is designed to detect diversion by a national government in violation of an international agreement. Moreover, the primary means used to carry out these disparate objectives are consequently very different: the U.S. system uses primarily a combination of physical barriers and security forces, and, secondarily, a system of materials accountancy, while the IAEA system uses primarily materials accountancy, based on national systems, and limited verification through international inspection.

The initial study of the feasibility of internationalization of nuclear fuel cycle facilities was made in 1945/46 in the Acheson-Lilienthal Report. That historic report concluded that nuclear power must be developed under a strong international authority with pervasive licensing control over all phases of the civilian nuclear fuel cycle from the mine to the radioactive waste management facility. These conclusions formed the basis for the Baruch Plan presented by the U.S. government to the United Nations in 1946. Internationalization is technically feasible and economically desirable. The political will is missing, however.

I believe the time for study of this matter has past, and the time for action has arrived. Accordingly, I would like to conclude this statement with some specific suggestions regarding the substance of U.S. nuclear power export policy. Some of these might be incorporated into S. 1439, while others might form the basis for U.S. foreign policy initiatives.

First, the U.S. could offer to provide its most advanced uranium enrichment technology for large enrichment facilities that would be built outside the United States under multinational ownership and IAEA safeguards. Such an offer was extended in 1971 and again as part of the International Energy Problem growing out of the Washington Energy Conference in 1974. It must be pursued with urgency as part of a broader effort to encourage the multinational ownership and operation of chemical reprocessing, fuel fabrication and associated nuclear material storage facilities.

Second, in addition to the requirements for IAEA safeguards under the NPT or under U.S. agreements for cooperation with countries not parties to the NPT, the U.S. could adopt the following nuclear export policy:

a. Low-enriched uranium LWR fuel. Nuclear fuel containing low-enriched uranium produced in U.S. enrichment facilities for use in power reactors in foreign countries would be reprocessed either in U.S. facilities or in facilities multinationally owned and under IAEA safeguards. Plutonium recovered from reprocessing would be stored until fabricated and fabricated into complete fuel assemblies in a fuel fabrication facility on the same site as the reprocessing facility.

b. High-enriched uranium HTGR fuel. High-enriched uranium produced in U.S. enrichment facilities for use in power reactors in foreign countries would be fabricated into complete fuel assemblies in the U.S. and reprocessed either in U.S. facilities or in facilities multinationally owned and under IAEA safeguards.

Restrictions comparable to recovered plutonium would apply to recovered uranium-233.

c. Power reactors. The same restrictions would apply to fuel used and produced in foreign power reactors exported from the U.S., or incorporating major components exported from the U.S., as to fuel enriched in the U.S.

d. Nuclear material exports for nuclear power R & D. U.S. exports of high-enriched uranium or plutonium for use in foreign nuclear power research and development activities would be subject to specially negotiated conditions as to safeguards during use.

e. International safeguards against governmental diversion. Article III, paragraph 2 of the NPT would apply.

f. National safeguards against non-governmental diversion or sabotage. U.S. exports of nuclear materials and equipment would be subject to a requirement that they be protected in the recipient country and any third country to which they may be transferred by physical security measures designed to give at least the level of protection afforded similar materials and equipment in the U.S.

The above policy suggestions do not differentiate between nuclear-weapon and non-nuclear-weapon countries, or between parties and non-parties to the NPT. The absence of discrimination may be viewed as an advantage, but it may nevertheless introduce complications.

Such a U.S. policy would not succeed unless other countries develop a common view of nuclear power interdependence as being in their own long run economic and security interests. The non-nuclear-weapon countries must seize the present opportunity they have now -- but not for long -- to develop nuclear power on the basis of interdependence instead of self-sufficiency. The major industrial countries of Western Europe and Japan, the resource rich non-industrial countries, and the less developed countries need not be dependent upon the United States or the Soviet Union. Instead, they can develop cooperation among themselves. This is the kind of interdependence that will be most important.

In the nuclear era, it is clear from an economic viewpoint, and even more from a security viewpoint, that the interests of nations are becoming increasingly interwoven into an interdependent world.

Table 1

NUCLEAR ELECTRIC GENERATING CAPACITY*
As of December 31, 1974

	In Commercial Operation	Under Construction or Ordered	Total
USA	31,000	190,000	221,000
OECD (excluding U.S.)	24,100	86,100	110,200
Austria		692	692
Belgium	390	3,190	3,580
Canada	2,512	6,236	8,748
Finland		2,160	2,160
France	2,888	18,478	21,366
Fed. Rep. of Germany	3,908	16,198	20,106
Italy	547	2,814	3,361
Japan	4,537	11,016	15,553
Netherlands	532		532
Spain	1,073	7,262	8,335
Sweden	1,020	6,329	7,349
Switzerland	1,006	4,847	5,853
United Kingdom	5,332	6,450	11,782
Communist Countries	4,109	7,825	11,934
Bulgaria	440	1,320	1,760
Czechoslovakia	110	1,320	1,430
Hungary		880	880
Rumania		440	440
USSR	3,459	3,250	6,709
Yugoslavia		615	615
Developing Countries	1,044	15,200	16,244
Argentina	319	600	919
India	600	1,140	1,740
Iran		4,200	4,200
Korea		1,764	1,764
Mexico		1,320	1,320
Pakistan	125		125
Philippines		1,252	1,252
Taiwan		4,924	4,924
World	60,253	299,125	359,378

*Source: Nuclear News, Mid-February, 1975.

[Whereupon, the committee was in short recess.]

Senator GLENN. We will now hear our second panel of today, which is as follows: Gen. Edward B. Giller, Deputy Assistant Administrator for National Security, Energy Research and Development Administration; Dr. Abraham Friedman, Director, Division of International Programs, Energy Research and Development Administration; Howard J. Larson, Director, Division of Materials and Fuel Cycle Licensing, Nuclear Regulatory Commission; Ralph G. Page, Director, Division of Safeguards, Nuclear Regulatory Commission; Rauer H. Meyer, Director, Office of Export Administration, Department of Commerce; Dixon Hoyle, Acting Deputy Assistant Secretary of State for Energy and Technology Affairs; and David Elliott, staff member, National Security Council.

Before we start with any statements that you gentlemen may have, any statements that could be put in the record, so we might have more time discussing some of the items in question, there was one other thing I would like to have just for the record.

Mr. David Elliott, from the National Security Council staff, had been asked to testify, and he had refused, or declined to do so. I do not know whether Mr. Elliott wished to make a statement as to why he declined to testify. Is Mr. Elliott here?

TESTIMONY OF GEN. EDWARD B. GILLER, DEPUTY ASSISTANT ADMINISTRATOR FOR NATIONAL SECURITY; ACCOMPANIED BY DR. ABRAHAM FRIEDMAN, DIRECTOR, DIVISION OF INTERNATIONAL PROGRAMS, ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION; HOWARD J. LARSON, DIRECTOR, DIVISION OF MATERIALS AND FUEL CYCLE LICENSING; RALPH G. PAGE, ACTING DIRECTOR, DIVISION OF SAFEGUARDS, NUCLEAR REGULATORY COMMISSION; RAUER H. MEYER, DIRECTOR, OFFICE OF EXPORT ADMINISTRATION, DEPARTMENT OF COMMERCE; DIXON HOYLE, ACTING DEPUTY ASSISTANT SECRETARY FOR ENERGY AND TECHNOLOGY AFFAIRS; HAROLD D. BENGELSDORF, DIRECTOR OF OFFICE POLICY, PLANNING, AND ANALYSIS, OES, DEPARTMENT OF STATE; AND DAVID ELLIOTT, STAFF MEMBER, NATIONAL SECURITY COUNCIL

Mr. ELLIOTT. Senator, I did not receive an invitation to testify.

Senator GLENN. I understand from the staff that it had been extended in written form.

Mr. ELLIOTT. I did not get it.

Senator GLENN. Here is a letter, this is written to Secretary Kissinger asking that Mr. Hoyle and Mr. David Elliott appear before the committee on April 24 to participate.

Mr. ELLIOTT. Was that sent to the Department of State or to the White House, Senator?

Senator GLENN. That was sent to the Department of State.

Mr. ELLIOTT. The Department of State does not exchange mail with us.

Senator GLENN. I might state, as acting chairman of this committee, I think that is a rather weak one, but it would seem to me, that with Mr. Kissinger's staff, and his wearing two hats back and forth to the White House, and as Secretary of State, that he perhaps would have this staff secure your counsel, but perhaps that is not the way they operate over there these days.

Mr. ELLIOTT. It is not.

Senator GLENN. You may receive another invitation directly without going through the Secretary.

General, would you like to leadoff? I do not know whether any of you gentlemen have prepared statements, or statements you would like to summarize or put in the record. I will leave it up to you. We obviously want to save as much time as we can, without running this into the late afternoon.

General GILLER. My understanding is that there would be no statements required. I have none, and I do not know if any of the other members have any.

Senator GLENN. Do any other members of the panel have a statement? Fine. Then we will proceed with questions.

One of the areas I would like to get into, since you gentlemen represent the different branches of Government that cooperate in this whole field of licensing and exports, is to try to learn a little bit about how you cooperate now, how the bill we propose might affect your operation, and if you think it would or would not be an improvement, and how you think it would supply the IAEA, because it is obviously an international problem.

General, do you want to leadoff here? Let me ask some specific questions. I will go into this South African matter as a case study. I do not want to beat it to death, but the South African situation appears to be an illustration of how these things apply to various agencies.

General GILLER. I think it would be appropriate for Dr. Friedman to answer that, who has the back history of the reasons we have agreements with South Africa, the fundamental basis upon which the agreement rests, to describe the background together with State, which, of course is a party to this decision.

Senator GLENN. Before you comment, Dr. Friedman, use this as a case study, if you would, as to what happens in a request like this, or what the agreements were.

I am not trying to pin anybody to the wall, I would rather use this as a case study to show how the whole process works, and how it might be altered to benefit the safety of everyone if we changed the system.

Dr. FRIEDMAN. Senator Glenn, what I thought we might do, and with your approval, is to summarize what the procedures are in developing agreements for cooperation, and I will do as you requested as to the South African situation.

Agreements for cooperation and amendments thereto are concluded between the U.S. Government and other governments or group of nations pursuant to section 123 of the Atomic Energy Act of 1954, as amended. Conclusion of such agreements involves the authority of the Department of State with respect to Executive Agreements and to the conduct of foreign policy.

The draft text of a proposed agreement or amendment is typically prepared by ERDA and the Department of State. Depending on the country involved and the nature of the proposed agreement, the views of other executive agencies, such as ACDA are obtained. Furthermore, we bring to the attention of the Joint Committee on Atomic Energy our intention to negotiate an agreement. Following agreement on a draft text it is presented to the foreign party for consideration on an ad referendum basis. After ad referendum agreement is reached by the parties, the text must be approved by the ERDA Administrator and the Department of State.

The approved text is then initialled by representatives of ERDA, the State Department and the other party to signify agreement on the text language—subject to further approvals—and submitted by ERDA to the President for his approval. Before approving and authorizing the execution of the proposed agreement, the President must determine in writing "that the performance of the proposed agreements will promote and will not constitute an unreasonable risk to the common defense and security." Following this determination the agreement is formally signed by representatives of ERDA and the State Department—on behalf of the United States—and by the other party.

The signed text is then submitted to the U.S. Congress, where it must lie for a statutory period. Prior to enactment of Public Law 93-485 on October 26, 1974, amending section 123.c. of the Atomic Energy Act, all agreements for amendments were submitted to the Joint Committee on Atomic Energy and lay for a statutory 30-day period. Under Public Law 93-485, all agreements involving significant cooperation—that means, assistance involving reactors producing more than 5 thermal megawatts—must lie before Congress for 60 days. During this period Congressional hearings on the proposed agreement are generally held by the JCAE. If during the 60-day period the Congress adopts a concurrent resolution stating in substance that it does not favor the proposed agreement, the agreement cannot become effective.

If the Congress takes no such action, the final step which brings the agreement into force is an exchange of notification between the parties, by the State Department on the U.S. side advising that all their respective statutory and constitutional requirements have been completed.

In the case of the agreement for cooperation with Africa, which has been in effect for many years, the Joint Committee on Atomic Energy held hearings on the superseding agreement on June 9, 1967.

Senator GLENN. How about followup shipments, do they run through the same process?

The problem here is that we have sent South Africa four or five times the amount of fuel needed to run the reactor that we know about anyway—that is, above and beyond the normal amounts of fuel that they would be expected to use. If all of this excess is transferrable directly into weapons, there would be sufficient material for eight nuclear weapons in addition to running the plant.

I am not accusing South Africa of anything, but what procedure is run through as a follow to the initial sale?

Dr. FRIEDMAN. Each shipment, of course, requires a license, and licensing procedures have been discussed.

They are a primary subject to your proposed legislation, of course, and I think there are people here who will or can discuss it further, but each shipment is subject to a license.

Senator GLENN. A similar process you outlined a moment ago.

Dr. FRIEDMAN. The process I outlined is the basic agreement for cooperation, under which we then agreed to supply fuel for reactors, and then the actual supply is subject to the appropriate licensing and determinations that material would be appropriately safeguarded.

If I may make a comment on your comment, on the quantity involved, the South Africa reactor is a 20-megawatt reactor.

It went critical in 1965, and with the schedule of operation presently in use for a typical 20 megawatt thermal reactor, operating 5 days a week, it requires a reload of core every 3 weeks.

Such a reload requires four new elements of 200 grams of uranium-235 each load.

Each 6 weeks, it requires a new control rod containing 135 grams of uranium-235. Over a period of 1 year taking into account a total of 10 weeks of shut down time, a reactor such as the Safari reactor, a 20-megawatt reactor, would require an average of 14 reloads of fuel elements and 7 reloads of control rods.

The annual requirement is therefore 56 times 200 gram elements, and 7 times 135 gram control rods, giving a total of 12.145 kilograms, that is roughly 27 pounds, contained in a total of 13.494 kilograms, or about 29 or 30 pounds of uranium.

So if you consider that there needs to be frequent reloads, that the elements coming out of a reactor are very highly radioactive and have to be stored for cooling in a cooling pond for some time, the quantity of materials is not inconsistent with good reactor practice.

Senator GLENN. I did not know all of the arithmetic there, but I do not believe that would require additional orders, that would account for what was sent—a good chunk of it. Why would they need all of the additional then?

Dr. FRIEDMAN. In view of the fact every 3 weeks an additional core needs to be supplied, a typical core, I think, well——

Senator GLENN. I think rather than going through all of the arithmetic, will you supply that for the record, and how it totals out, including their orders, their requests for orders for the future, the 56 pounds, which totals up to the 112 pounds of extra U235 that they have ordered from the supplier in Oak Ridge, if you could furnish for the record, we would not have to go through all of it.

[The information requested and subsequently supplied follows:]

SOUTH AFRICA

SAFARI-I RESEARCH REACTOR

REACTOR TYPE:	ORR tank, fully enriched (90%) uranium, light water moderated and cooled, beryllium reflected.
POWER:	20 MW thermal: Initially 6.67 MW cooling capacity.
LOCATION:	National Nuclear Research Center, Pelindaba, near Pretoria, South Africa.
OWNER:	South African Atomic Energy Board
DESIGNER/BUILDER:	Reactor: Allis-Chalmers Manufacturing Co. Building, process equipment, etc: Atomic Energy Board and South African Firms
CONSTRUCTION:	Start of Construction: 1961 Reactor Critical: 1965

Typical operating core consists of:
22 fuel elements
5 control rod elements
22 Beryllium reflector elements
23 Al filler pieces

With the present schedule of operation at 20 megawatts thermal operating 5 days a week SAFARI-I requires a reload every 3 weeks, when 4 new elements of 200 gm U-235 each are loaded. Every 6 weeks 1 new control rod containing 135 gm of U-235 is loaded. Over a period of 1 year taking in account a total of 10 weeks shutdown time, the reactor requires an average of 14 reloads of fuel elements and 7 reloads of control rods. The annual requirement is therefore 56 times 200 gm elements and 7 times 135 gm control rods giving a total of 12.145 kg of U-235 contained in 13.494 Kg uranium at 90% enriched.

SAFARI-I RESEARCH REACTOR

The following is a list of shipments of highly enriched uranium supplied to South Africa for the operation of the SAFARI-I research reactor. All material was supplied in the form of finished fuel elements by the fabricator. Material supplied by the UKAEA was of U.S. origin, originally shipped to the U.K. specifically for fabrication into SAFARI-I elements. Its subsequent transfer from the U.K. to South Africa was authorized before the fact by the U.S.

DATE	U	U-235	FABRICATOR/SHIPPER
Feb 65	4.315	3.874	Babcock & Wilcox
May 65	3.446	3.096	Babcock & Wilcox
Oct 67	2.526	2.273	UKAEA, Harwell, U.K.
Nov 67	8.299	7.469	" " "
Dec 67	2.541	2.286	" " "
Dec 69	7.558	6.802	" " "
June 70	5.767	5.190	" " "
Dec 70	.975	.878	" " "
July 71	13.334	12.001	" " "
Sept 71	.663	.596	" " "
May 72	.971	.874	" " "
Dec 72	4.641	4.177	" " "
June 73	2.139	1.925	" " "
Aug 73	3.167	2.850	" " "
Apr 73	.300	.270	" " "
Oct 73	3.089	2.780	" " "
Jan 74	5.217	4.696	" " "
Apr 74	3.691	3.322	" " "
May 74	3.092	2.782	" " "
June 74	3.530	3.177	" " "
Nov 74	4.299	4.006	U.S. Nuclear, Inc.
Dec 74	3.437	3.203	" " "
Mar 75	3.444	3.209	" " "
TOTAL	90.441	81.736	
Less Returns	(34.251)	(28.154)	
Less Burnup thru 12/31/73	(11.473)	(13.897)	
Less Burnup 12/31/73 to 4/30/75 at 0.333 kg/mo.	(5.333)	(6.460)	
Inventory	39.384 kg.	33.225 kg.	

SOUTH AFRICA
SAFARI-I RESEARCH REACTOR

The following information has been supplied by U.S. Nuclear, Inc., Oak Ridge, Tennessee, the firm holding contracts with the South Africa Atomic Energy Board to supply fuel elements for the South Africa SAFARI-I research reactor.

One order from South Africa is:

52 elements containing 200 grams U-235 ea. 93.15%
8 elements containing 135 grams U-235 ea. 93.15%

Total Order: Approximately 12.411 Kgs U
11.480 Kgs U-235

U.S. Nuclear, Inc., has a second order: 13.055 Kgs U
12.080 Kgs U-235

U.S. Nuclear, Inc., anticipates a third order of: 25.466 Kgs U
23.560 Kgs U-235

Senator Glenn. I would like to get into how we would set up an intergovernmental control agency, if we decided to go that route, for the next 10 years.

In this proposal, in licensing, I would like a general comment from any of you here who have worked in this whole field, as to the need for controls, both domestically and internationally.

Maybe it is a dodge at the current time, and yet it may be the most practical solution to some of this, and that is to require that all plutonium, generated by nuclear power plants, must be kept in place in a storage facility, at the plant, or where ever it is. And we are not worried only about the transporting problem. There are obviously new techniques—who knows, for example, what will develop out of the laser technique for separating weapons-grade uranium. And there are other areas of investigation that may make reprocessing of fuel difficult, perhaps less costly in a controllable situation, but one of the proposals that have been made is that we just try and take plutonium and get everybody to agree to keep it in place while we do some research on how to better handle it and process it.

Do you favor that, oppose, it or is it unrealistic?

Dr. Friedman. Again, at the risk of hogging the microphone, I think that the idea of holding onto the radiated fuel elements, until appropriate reprocessing facilities and appropriately safeguarded facilities are available, and appropriate handling is available makes some sense.

In fact, in the United States, this is what is being done.

Currently, the fuel elements coming out of reactors are being stored until reprocessing facilities are available.

It raises several problems. One, the actual physical capacity of the storage facilities, they have to be stored and have to be protected from the safety point of view, the facilities have to be stored under water, that is a problem.

Another problem, as I see it, is that all of this time we have been talking about two aspects of the safeguards problem.

One is the diversion, national diversion which we feel is appropriately being addressed by International Atomic Energy Agency safeguards. They have a well trained and large staff, and we have no reason to feel that they are not doing an effective job on safeguarding from the point of view of identifying possibilities for national diversion.

The other problem is the one that the committee has been addressing, and is of particular concern, and that is subnational terrorist activities, and even though spent fuel elements are not capable without very significant sophisticated chemical processing, are not capable of being fabricated into weapons, from a point of view of terrorism, you still do not want highly radioactive material stored in very significant quantities in some of these countries, so I think that is one of the problems one might have with your proposal.

Senator Glenn. It is a very rapidly developing field obviously, and as I indicated a moment ago, the laser process does not involve reprocessing. All I was indicating is it is a very rapidly developing field, and any agency alinement we set up should be flexible enough so we do not have to keep changing it in light of new development.

Mr. Larson and Mr. Page, I might ask, what regulatory role does the present Commission, or did the past Commission, play in determining the adequacy of safeguards with respect to the South African shipments?

Mr. LARSON. I am Howard Larson, Mr. Chairman. We received the last application in November 1973, and our process in receiving one of these applications is to look at it and review it for completeness. That is, who is the exporter, which country it is going to, what is the end use for the material—particularly if it is the type of material as it was in this case—what type of packaging is required to handle it, what is the form of the material, are there any intermediate consignees, what is the quantity of the material. This has been the process we have used in the past, when, of course, there was one Atomic Energy Commission divided into a General Manager side, and the Regulatory side.

As Mr. O'Leary pointed out, and I believe basically properly described the performance of the function I just described, we sent that application to the Division of International Security Affairs, where they made the determination as to whether or not there were "Agreements of Cooperation," or what agreements existed, and whether it was proper for us to issue a license for the export of that material.

That has been the situation in the past.

Senator GLENN. My time has far expired.

General GILLER. May I comment on it, since ISA was under my organization, I think it is not really fair to say ISA made the determination. The Commission was the spokesman for the Federal Government.

The Commission made the determination. The five members of the Commission made the determination in principle on all exports. In fact, in those situations that were important, they were raised to their level of attention.

The Commission did not have the time to deal with situations involving small amounts of material, or where the members of the other executive branch agencies felt were not significant enough to warrant policy consideration by the Commission. In carrying out our function within the AEC, we were part of an operating mechanism involving State, CIA, National Security Council, and ACDA. We drew from there all of the background necessary to make a determination, and to put down on paper the results and send it across, within the AEC, from one operating arm to another. I feel we should not leave the impression that the Commission delegated to one staff individual in [Regulatory] their total responsibility. That is incorrect, for there were times when we sent cases to the Commission, and licenses were denied, for good reasons.

Senator GLENN. What were some of those reasons?

General GILLER. As an example, a case happened 3 years ago. A U.S. company requested a license to ship zircaloy rods to a foreign country. You have to have reactor expertise to even know that zircaloy rods are an important item. This is a special kind of material used in reactors and they wanted to send it to India, the Indians wanted to put it in an unsafeguarded reactor. When everyone in our Government was consulted, and all of the facts were in, the decision was reached to deny the license and it was never issued. That is such an example.

Senator PERCY. Mr. Chairman, I would like to express my appreciation to this panel for being here, and also for thoughtfully consulting with our majority and minority staff, in the preparation for these hearings, and in the work that they did leading toward legislation. We do wish to tell you how much we appreciate that.

I would like to pursue just a little bit more Senator Glenn's comments, and questions on South Africa.

Primarily, I would like to pursue because charges have been made, and because we are concerned that South Africa has not signed the nuclear Nonproliferation Treaty, has no treaty abrogation to restrain them from building an atomic weapon, or to insist on safeguards against building weapons in its exports to other countries.

Because of the vote, I came in a little late. If I duplicate any questions that have already been answered, in the transcript, it will be fine to just let me know.

The charge has been made that we did permit a special computer to go to South Africa to help it enrich its own uranium, and I think, Mr. Meyer, you would probably best be qualified to answer and respond to why we did that.

Was there consideration of not doing it?

What were the pros and cons on the matter?

Mr. MEYER. Senator, we did license a computer, to the Foxboro Co. As a matter of fact, there were two of these modest computers. These are best described as standard computers; they were not specially designed for nuclear research work.

Senator PERCY. Are they available from any other computer manufacturer outside the United States, and would they have been—could they have been purchased to accomplish exactly the same purpose and have the same capacity and capability, from outside sources of supply from outside the country?

Mr. MEYER. A company official told me this morning that they are available outside the United States and could serve the same purpose.

Senator PERCY. And what?

Mr. MEYER. And could serve the same purpose at that facility.

Senator PERCY. From what company?

Mr. MEYER. I do not have the specifics. I would be glad to identify the companies and supply the information for the record.

The British, the French, the Japanese, the West Germans all have computer manufacturing industries, and I suspect you would find that a number of those countries have that capability.

[The information referred to and subsequently supplied follows:]

COMPUTERS EQUAL TO FOXBORO FOX 1 AVAILABLE IN 1971

Denmark—Regnecentralen RC 4000.
England—Computer Technology Modular I, Plessey XL 9, ICL 1900 series several models).
France—CII Iris 50.
West Germany—Siemens 4004/3, Telefunken TR 86.
Israel—Elbit Model 100.

Italy—Laben Model 70.
Japan—Fujitsu Facom Mate, Hitachi Hitac 10, Mitsubishi Melcom 70, Panasonic MC 7/F.
Norway—Norsk Data-Elektronikk Nord I.
Sweden—DATASAAB D22.
Netherlands—Phillips P 860, P 880.

Source: U.S. Department of Commerce, National Bureau of Standards.

Senator PERCY. Before issuing a license on something with these consequences, do we have our own facts, and our own knowledge, and base it on our firsthand judgment? Was that a factor in the considerations prior to the granting of this license?

Mr. MEYER. We do have it on the staff, people that have this knowledge. We do have the computer technicians, and these technicians do recognize the computers for what they are, namely in terms of power, modest computers. In light of the fact that the computers had a modest range of power, were available abroad, and design, and since the software was conventional software, the judgment was made that these computers could appropriately be licensed.

Senator PERCY. What is the rough cost of such a computer?

Mr. MEYER. Rough cost?

Senator PERCY. Yes.

Mr. MEYER. The two computers were valued at $1,725,000.

Senator PERCY. When we take into account that in South Africa, they have a surplus now of about 70 pounds of highly enriched uranium, which is enough for about five nuclear weapons, how can we account for the fact that they have two more orders at U.S. Nuclear, Inc., Oak Ridge, Tenn., from South Africa, for fuel elements containing 56 pounds of high enriched uranium, and that we do anticipate, I understand, a third order containing an additional 56 pounds for a total of 112 pounds, which would be enough for eight nuclear weapons. What consideration do we give when a country like South Africa places orders with us, when we have knowledge of this surplus material that they now have on hand from previous orders?

Dr. FRIEDMAN. Senator Percy, I answered some aspects of that question earlier, but let me recapitulate.

The operating requirements for that reactor, and the frequency with the core of enriched uranium must be replaced, is such that the quantity of material that they have is not an unusually large quantity. Much of it is in the cooling tanks, where they are very highly radioactive, and cannot be used as a nuclear weapon.

The current orders, the current requests from South Africa involve one order for approximately 11.5 kilograms of U–235, and then there is a second order of 12 kilograms and there is an anticipated third order, but not yet in, of 23 kilograms of U–235.

Now, these orders are large enough so that they will be reviewed carefully, even though, first of all, I should point out that the uranium is supplied as fabricated fuels, so that again, they are not in the form which is conveniently convertible to a weapon.

Second, of course, the International Atomic Energy Agency is involved, and I would like to elaborate, because I think earlier speakers might not have gone into that kind of detail, it involves not only a materials accountability, which is important, but it involves physical inspection, as well as tamper-proof instrumentation, to make sure that when elements are in reactors, they cannot be surreptitiously removed, so they are appropriately safeguarded.

Senator PERCY. Dr. Friedman, do we have all of the details of the agreement between IAEA and South Africa, as to their accountability, and the use of the safeguards?

Dr. FRIEDMAN. We have details as to the procedure, the safeguards system to be applied; as regards the day-to-day safeguards, the accountability records, and the plans for inspection, the IAEA is in there, and in order to carry out the safeguards inspections, without undue influence by other member countries, they feel they need to keep their information to themselves.

I should like to complete one more thought, the size of the quantities involved here are such that not only do we require, as always the IAEA safeguards, but we will need to see ourselves that appropriate physical security provisions are in force before we will recommend to the licensing authority that this material be shipped.

Senator PERCY. Does South Africa have safeguards comparable to ours against the theft of materials?

General GILLER. As background to the question to which you are referring, much of the South African fuel has been there and has been returned to the United States after use.

A lot of it has come back already, and all fuel has been under IAEA inspection which we described earlier. This gives us some insight into their physical security. They do not have it moving around from place to place because it is for one research reactor.

It is not really in transport, except in and out of the country. It will not be reprocessed there. They have a very small localized exposure to terrorist threats.

It was the U.S. Government that decided some 6 months ago, that it would require an adequate physical security determination before it would ship so-called trigger amounts of material. That is, amounts above 5 kilograms of highly enriched uranium and 2 kilograms of plutonium. Amounts below that, if lost, are not capable of being made into a bomb. They are still accounted for under the IAEA system. The point is if they were hijacked, and this would presumably be by some subnational group, they would not be able to make an explosive.

If the next shipment to South Africa exceeds these trigger quantities, it will require that we do an analysis of their physical security including an onsite inspection. Then the United States would reach a determination in the executive branch, that their physical security is adequate or not.

Since different countries have for example, various constitutional provisions, we cannot have, realistically require parallel systems. For example, if we have armed guards, then they would have to have armed guards where it is not permitted. We have to determine the adequacy, based not only on their published and unpublished regulations, but also on confidential discussions that they have with us bilaterally. Many countries don't publish their detailed security information since this might reveal how to get around their security combinations. They are willing to talk with the United States on a confidential basis. They appreciate the fact that sufficient understanding of their physical security on our part is required.

We have had no problem in discussing with a number of countries their interest in physical security in some detail. We have had five countries come here already, of the nine who have been invited and we have spent several days with them. We discussed our research, their research, and talked over their strengths and weaknesses. The U.S. system is not the best in all its various aspects and for every situation.

Every country has some strengths and weaknesses. We are all rapidly reaching a general appreciation of the importance of physical security. It is only a question of how fast we and they get accomplished what is necessary.

Senator Percy. I know of the intensive reaction I felt in my own State, when we were introducing nuclear technology in the Mideast.

We all know the intense reaction that the world had when India made its announcement, and the concerns it caused other countries on the subcontinent.

Motivation is a large factor.

Before we approve the export of weapon grade materials, do we have a regular procedure, whereby the agency in charge of issuing a license is briefed, as to what the motivations of the recipient country may be, and what the likely consequences of the introduction of this material into those countries may be?

General Giller. The Energy Research and Development Administration is a member of the U.S. Intelligence Board. As such, we are privy to all such documents. ERDA maintains three very active research and development units in its weapons laboratories that do work on weapons proliferation for the U.S. Government intelligence agencies. Some export cases do require the use of intelligence, as background. This is available to us on a regular and useful basis.

Senator Percy. Mr. Larson, would you care to respond to that question? Do you personally attend agency briefings in each instance where you are required to make a decision?

Mr. Larson. Not to my knowledge, sir. I took this position when the Agency was formed, so I cannot say what happened before that.

Senator Percy. Do you think it would be a good idea to take that factor, and what the motivation may be?

Mr. Larson. Yes, sir, I think it would be. I know in our own particular case at this particular time, with our split with ERDA, we are looking with ERDA, and other branches of the executive department to determine what is and should be the proper way for handling our responsibilities as we see them now.

As the Commissioners themselves have publicly indicated, they are looking at each particular export license for significant quantities of source or special nuclear materials themselves. The staff prepares the documentation for them, based on the information that we have received and the documentation that we get, and presents it to them. Then they make a judgment.

When Mr. Anders appears next week, he may be able to give you the results of those meetings with other branches of the executive departments, so that he can tell you how we are proceeding.

At this time, though, we are working on a license by license, case by case basis, where the Commission itself is heavily involved in the licensing processing.

Senator PERCY. You or your staff have necessary authority to make such requests though for such background briefings?

Mr. LARSON. I would assume that we have.

Senator PERCY. Program clearances available to you and your staff for that purpose?

Mr. LARSON. I would expect that we have.

General GILLER. One of the Commissioners himself has the clearances. It is their responsibility to decide on clearances.

Mr. LARSON. I know that members of the Commission, several of them, are heavily involved in dealing with other groups, including ERDA, the State Department, and Commerce.

Senator PERCY. I wonder if someone could tell the committee how many inspectors we have in our entire domestic safeguard program?

What is the size of the complement of inspectors that we have, roughly?

Mr. PAGE. Mr. Percy, I do not have the precise number, but it is on the order of 70 inspectors that we have for the NRC inspection program.

Of course, there are inspectors in the ERDA facilities as well.

Senator PERCY. I understand the IAEA budget provides only about $4 million for international inspection, or about 60 inspectors for 30 countries.

Would any of you care to comment on the adequacy of that budget. How would that compare with our own budget of some 70 inspectors for one country?

Dr. FRIEDMAN. Mr. Percy, the IAEA budget for their department safeguards and inspection is $4,802,000.

Senator PERCY. How many dollars?

Dr. FRIEDMAN. $4,802,000.

Out of a total IAEA professional staff, of 355——

Senator PERCY. Do you have a breakdown as to the number of inspectors. Is my figure of 60 actual inspectors correct?

Dr. FRIEDMAN. The breakdown is as follows. In the Office of Inspector General, and that is an administrative office, there are two professionals and four nonprofessionals.

In the Division of Development, whose function is to develop safeguards, procedures and techniques, there are 22 professionals, and 9 nonprofessionals.

In the Division of Operations, which has the responsibility of carrying out inspections, there are 72 professionals and 21 nonprofessionals.

That is the extent of the breakdown that I have available.

Senator PERCY. Could you comment, Dr. Friedman, on the adequacy of that budget, and the professional personnel connected with the safeguard program that covers some 30 countries?

Dr. FRIEDMAN. My view is, I can say that it is an adequate number, but with the very rapid increases in nuclear power throughout the world, this staff and the budget will have to be increased markedly.

I believe that the increase is already being planned, but in some I think that the number is adequate for today, it is inadequate for tomorrow.

Senator **Percy**. Do you happen to know whether provision is being made to provide adequate budget to bring onstream, and adequately train enough personnel to take into account the known load factor that we are going to have?

Dr. **Friedman**. Qualitatively, I think the answer is yes, but I think the representatives from the State Department may have some quantitative data.

Mr. **Hoyle**. I was not going to speak so much to the budget, although maybe my colleagues can, but to the fact the 30 nations might be a somewhat misleading figure in that the programs of many involve only small research reactors and relatively nominal programs compared to the United States, so I think one has to be somewhat careful in making any comparisons on that basis.

Senator **Percy**. Senator Glenn, I have two questions left.

General **Giller**. I would like to add one point on the question of the number of inspectors. That is one measure of the ability to inspect, or to know what is going on.

You basically want to know what is going on. The use of technology, which is in place when the inspector is not there, is a most valuable addition. Even though there is not an inspector, there are mechanisms which permit the monitoring of special nuclear materials. In ERDA there is a research and development program addressed to the very point. How do you provide to people the equipment they need to do a better job of safeguarding? We use all our laboratories and our money to do it for the United States, and to make available to IAEA. We will develop under special-order equipment especially for them. Those inspections are supported by more than just people.

Mr. **Page**. I have looked at some documentation that we had with us, and for this year, we had 50 inspectors. For fiscal year 1976 we expect to have 70, but now the number is 50.

Senator **Glenn**. Fifty doing what?

Mr. **Page**. Making safeguard inspections of licensed facilities.

Senator **Glenn**. Would it be passing on construction of a new plant, this is strictly safeguards inspections?

Mr. **Page**. That is correct.

Senator **Percy**. General Giller, could you tell us approximately the number of inspectors that EDRA has?

I would like to get a feeling as to the total U.S. complement of inspectors against the total international?

General **Giller**. ERDA only inspects government-owned plants, and some of these plants have permanent resident civil servants in large numbers, I guess you would say we have permanent inspectors.

Senator **Percy**. But those are some of the biggest in the world, and the other uranium plants in other countries are government owned. Why should not we get a figure then for ERDA and then the number of inspectors they have, which covers government-owned plants?

General **Giller**. The situation is quite different than in the commercial sector where you go in and out of the plant. Our inspectors are frequently stationed in these plants. I will furnish these numbers and further explain the differences for the record.

[The following information was supplied for the record.]

ERDA devotes approximately 32 man-years of effort to safeguard inspections and related evaluations. Four inspectors are employed in the Washington headquarters. The remainder are stationed at ten ERDA field offices, in most cases collocated with the major plants handling special nuclear materials. The ERDA inspectors carry out, at a minimum, annual safeguards inspections at 35 major special nuclear material facilities owned by the Government. However, in a number of cases, for example, the gaseous diffusion plants, the ERDA safeguards inspectors are on the scene on a daily basis to carry out various aspects of safeguards inspection at the plant.

Senator PERCY. Whenever the IAEA has found a violation in a country, to which we are actually exporting special nuclear materials, do we have absolute certainty that there is a violation? Are we advised of it? Or could a situation exist, in which we are sending nuclear materials to a country that is at the same time violating its IAEA commitments, without our knowing it?

Dr. FRIEDMAN. I think the representative from the State Department could answer that.

Mr. BENGELSDORF. Senator, under its procedures, the Inspector General of the IAEA is compelled to bring to the attention of the Board any event of which he is cognizant that involves a seriously questionable activity.

If the Board then makes a judgment that there is a violation under the agreement with IAEA, a series of sanctions then can come in force, to bring about adequate security. For example, the matter can be brought before the U.N. Security Council. Assistance can be withdrawn, et cetera.

In the ultimate analysis, I think we all agree that the ultimate effect of a violation would be that public census and possible threat of a termination of supply and outside assistance.

Senator PERCY. But does that information flow automatically and directly then from the first point that we get it, to say the licensing authority so that they are advised at least before approving a license for shipping of materials. They are on notice, at least, that there is this violation?

Mr. BENGELSDORF. I should say to our knowledge, Senator, in the history of the IAEA system, there has never been a diversion.

The case of the Indian nuclear shot which is frequently alluded to, however, is a prime example of what can occur when a facility is not safeguarded, or when the undertakings are imprecise. However, to my knowledge, unless my colleagues have other information, there has never been a conscious diversion or breach of an IAEA safeguard agreement.

There was some anecdotal material presented this morning, which I heard for the first time. There were also some suggestions made that frankly, Senator, would give a number of us here some pain, to the effect that the IAEA is a fairly limp, weak, and understaffed organization.

I think our common perception on this side of the table is that for its current demands, the IAEA is doing a fairly active and indeed somewhat unprecedented job.

Senator PERCY. Is there any panel member who does not feel an upgrading of our U.S. safeguards activities, as we propose, is at all necessary?

Let me rephrase the question since you look puzzled.

Does anyone want to speak on the subject, as to whether or not the upgraded safeguards that we are proposing, are not at all necessary, and that nothing needs to be done in the field?

Dr. **Friedman.** I guess I would only say if nothing were being done, the constantly reviewing of our safeguard procedures, and if we were not constantly upgrading our safeguards and physical security procedures, then it would be obvious that something would need to be done.

Senator **Percy.** I think what we are trying to do in these hearings in a sense, for those of you who are working diligently to do that, is simply to indicate to you that you have a large body of support in the Congress, and, I think, a large body of support in the country, for getting an adequate budget, and for getting proper attention to this area.

I have long exceeded my time.

Senator **Glenn.** General Giller, if you want to add something, please do.

General **Giller.** Starting several years ago, we started a major effort to upgrade the physical security and inspection systems. I am sure we are not running fast enough to suit everybody. There is no lack of urgency on our part and no lack of coordination, I will not say no lack of funds, but we have been given a lot of extra funds. We would always like more, of course, but we are in fact moving very rapidly, very strong, and I think the record in all of its detail will support that.

Senator **Percy.** I want to thank all of you.

Senator **Glenn.** All of the coordinating effort is fine, but if we are only looking for the facts, do we really know where the plutonium is in the world, and what is being done about it?

We could coordinate until breakfast, and all of the coordination between agencies does not mean anything, unless we really have a handle on where the plutonium in the world is.

I do not share your confidence for the moment about IAEA having a good handle on all of this, nor do I have all of the confidence that some of you gentlemen have exhibited with regard to the cooperative efforts of solving our problems.

I am a little bit more critical of that. I heard here that the Indians destroyed a tape of the records remotely monitored, at least that is one of the charges Mr. Rosenbaum had made. Does our procedure then cut off further cooperation, immediately in that regard? Do we not send them anymore equipment, or anything, or cooperate in any way? Does IAEA do that?

I do not have any indication that is the case at all, and it seems to me, we have some very tough questions here.

I do not think everything is quite as great. Do we know where all of the plutonium in the world is, and what is being done? If not, what procedure do we get to do that?

I do not think we really know that answer completely in our own country.

Maybe the news reports have overblown some of this sort of thing out of proportion, but I think we do have some changes to be made, and I am afraid I do not have the complacency that you have, the complacent attitude, maybe that has been exhibited.

Would anyone care to comment?

That is a harsh criticism, but I mean it exactly that way.

I am certainly concerned about this. I know that. I am concerned when I see executive agreements made, and then there is a license going out; but does Congress see all of the licensing arrangements made under that executive agreement, under which fuel is sent to South Africa, India, God knows where, does Congress have some monitoring, and if not, then maybe we need some upgrading of our own procedures here. That is possible.

I am not just trying to criticize the Administration, but we have computers—What consideration was given? We have some sort of executive agreement with South Africa, and a computer is sent there, and they are building their own uranium enrichment plant. And yet, we do not have our inspectors in there who are monitoring that. What is the computer being used for? I do not know.

I am not as concerned about the computer at this point, as I am about the specifics of the process of letting this stuff get outside of our country, and proliferating around the world.

So, what under IAEA control is there to change? Is IAEA cooperating in any way with India?

I do not know. These are rather harsh indictments I am making, I guess, but we do have the statement from Dr. Friedman, that the President makes his decision on unreasonable risk.

We are playing doomsday here today. That is the big risk that we are taking, and if anyone can tell me that we know where all of the plutonium and the uranium is in this country and in the world, then I will go home and sleep better tonight. Until we get to that point, then I think we have a lot more work to be done in this country.

Senator PERCY. I will not let you sleep well tonight, because I have heard testimony today that stands in sharp contrast with the briefings that I have had from CIA. It disturbs me very much indeed that someone in a very high position did not have the same knowledge that I had when I do not have a direct responsibility, but rather a curiosity on some of those points. I do feel the hearings to that extent have been useful and helpful, and have reinforced our feeling of urgency about making absolutely certain that we provide every conceivable safeguard that we can.

We have that duty and responsibility, and we want to work closely with you in trying to work this out.

Senator GLENN. What we are dealing with is trying to set up an interagency mechanism, where we will get better coverage.

I know we will not get 100 percent, we do not have 100-percent control over dynamite or anything else that has ever been used as an energy source. But when I think of the magnitude of what can happen with some of this stuff getting out, I know we need to come as close to this as we possibly can.

What does anyone have to comment on with regard to the Indian situation? Do we need an upgrading of our monitoring situation of where this nuclear material is going, or of the approval procedure before it gets out?

The statement you read originally, it is very impressive—I do not say that very facetiously—that everybody is getting cut in the pattern. Yet we find things like this going on.

Do we need somebody put into that pattern, or somebody cut out, and why is this happening?

Does anyone want to make a comment, or maybe this gets off into the State Department field more than anything.

Yes, Mr. Page.

Mr. PAGE. Senator Glenn, I have no direct knowledge of international location of plutonium, but in the United States we have very tight controls over the transfer of material throughout the country.

We do have a nuclear materials information system that records all transactions, involving as much as one gram of plutonium, or one gram of uranium-235. Whenever there is a transfer of this material occurring between any two persons, a report of that transaction has to be sent in to us. So we do have a good record of the location of all plutonium and high- and low-enriched uranium in this country.

Mr. HOYLE. I would have to say the situation would be quite similar with regard to the location of plutonium abroad. Any transfers are documented and recorded, and these transactions are then checked by actual physical inventory from time to time, as in a bank audit.

We would all be living in a fool's paradise if we were to be complacent and not realize we are in an evolutionary situation, but we should remember that we are asking those abroad, who signed these agreements, to invest some $500 million in each thousand-megawatt nuclear power plant they buy.

They have to have assurance of continuity of supply. If, because we may feel they might be in a position to divert at some time, we shut off their fuel supply one time and then turn it on again, when something changes, I think the United States will soon be out of the international nuclear power business, and we will have handed this business to other nations.

Dr. FRIEDMAN. I would like to make this one comment. I think one of the problems we need to recognize is that we no longer are, and as time progresses, our role is even more significantly diminished, we no longer are the unique repository of all of the nuclear technology and material, and whatever we do, and obviously we need to do more, but whatever we do, it has to be done, to whatever extent possible, in consort with other supplier countries, so that we do not end up being so careful that we have a negative effect in that other supplier of countries, who may not be as careful, then replace us, and we are in a worse situation, so I think we need to not only proceed ourselves to improve our procedures, but we must work with our friends.

Senator GLENN. You are saying if we want to have a maximum impact on safeguards, we better be a part of the action?

Dr. FRIEDMAN. Conceivably, if we were to be the sole supplier, we would have the best control, but we are not.

Senator GLENN. I would agree with you. We are getting into an area too—and maybe this would be in your area to comment on—I think what concerns us, I think it concerns me, we have learned over the years to sort of live with the big powers, having a mutual balance of nuclear power, and I think we may not agree with the political philosophy of our major opponent, but I think we have developed a respect that they will not use this in just a wild moment of some international situation.

I do not think we have that same feeling about some of the smaller nations of the world that are now becoming technologically capable with a nuclear plant being purchased by them; that have become capable of building a bomb. The question is whether some of the smaller nations, in a moment of stress, might be less responsible than some of the big powers. This gives me a lot of pause, when I think of some of the smaller nations around the world getting atomic weaponry. Maybe strengthening IAEA is the only answer to it, or just restricting flow of material may be the only answer.

I know this must concern you people of the State Department. Do you have any comments on this? Can we apply different standards to big powers, little powers, I guess that would be difficult.

How do we deal with some of the places that are getting atomic weaponry, that are maybe a little less organized socially, and less responsible internationally, than perhaps we would like to see? Are there any different standards that we apply?

We already determined that we have different standards applied to licensing internationally and domestically. In our own country, as applied internationally, are there different standards that are applied, that come into play under some different agency setup?

Mr. Hoyle. I would highly endorse your statement that we should work to strengthen the Agency, as others have said.

I think before we wash it down the drain, we ought to think carefully about the options. In my view, working within the IAEA to strengthen its safeguards is the only way we have to go.

Now, with regard to the question of such strengthening, and particularly as we may have concerns over certain special situations in sensitive areas of the world, our policy in this area is continually evolving. Our agreements for cooperation are currently under review to see what can be done along these lines—along the lines, for example, that some of the earlier witnesses have suggested with regard to where the strategic nuclear material is reprocessed and stored, and these sorts of things. I hope that during the course of these hearings, as they continue, we will be able to convince you that we are trying to keep pace with this rapidly evolving situation.

Senator Glenn. We play such an important role, we supply, as I understand, some 90 percent of the enriched fuel for the world, so what happens around the world will be largely of our making, or at least of our control, to a pretty good size and extent.

We will be in that position for another 5 years or so. Beyond that point, maybe it proliferates beyond anyone's control.

Dr. Friedman. One of the problems is production of plutonium which is even greater in those reactors that do not take enriched fuel, those reactors that take natural fuel, we do not supply those reactors, so again we get back to my problem of not trying to solve the problem unilaterally, but trying to work with all suppliers.

Senator Glenn. It is getting late. We have gone some 40 minutes past the time we told everybody we would be finished today.

We did have a couple of votes that interfered, and I am sorry we have gone this long over, and we may want to submit questions to each of you for the record, so that we will have that as part of the record to be considered by the Whole Committee.

Just in closing, I would like to ask each one of you if there is one thing each of you could do, or one thing we could pass today, that might help us in this particular area, and overall, number one, an overall control of plutonium flow around the world. What would it be to keep things in place in each plant? And then the second area, interagency organization as you consider approval procedures, and the processes with which you are all more familiar than I am, if we could improve that whole setup to give us additional protection, are there any one or two things you would want to suggest?

If you would want to comment across the table, fine. I would like to have a comment from each one of you for the record, as to what you think would be the most important single thing we could do in each of those areas.

Mr. BENGELSDORF. Senator, we are here more or less as a fact-providing group.

Senator GLENN. We will consider this as one of the facts we want to know.

Mr. BENGELSDORF. I think one would be stupid to be complacent in the current situation that we face. I personally feel that in the ultimate analysis, you are appealing to other sovereign nations to foreswear nuclear weapons, and consequently, I tend to give first priority with all of its imperfection to strengthen the international approach through the IAEA. Moreover as General Giller mentioned, our efforts towards improving physical security, worldwide, which is much on your mind, as a threat, is one that we are approaching through cooperation and persuasion. We, for example, are not seeking to impose norms on others through fiat but rather are endeavoring to bring them along collectively, through persuasion. You will recall, for example, that the Secretary at the United Nations threw out the concept of an international convention in physical security area.

Now, this is the kind of thing that is very much on our mind, when we try to formulate our judgments on this bill.

In other words, I do not perceive any disagreements in term of objectives, but possibly some hesitances as to techniques.

I personally favor the international and multilateral approach.

Senator GLENN. Don't limit yourself to this bill. If you want to apply some of your comments to this bill, great, but I was thinking more across the board.

If each one of you would use the microphone, I think some of the people in the back are having a problem hearing.

Mr. HOYLE. Speaking personally, I would be perhaps more specific in my suggestion than Mr. Bengelsdorf, and I would urge increased funding for the safeguards effort, especially that specifically designated for the IAEA's safeguard system.

The Agency is living on a limited budget in a period of inflation, just as we are personally, and increased safeguards efforts funded from the General Budget reduce other types of available assistance, which often makes developing countries justifiably unhappy. I feel that increased, specific safeguards, funding is a very practical step we can take to strengthen and expand the efforts of the Agency.

Mr. Meyer. I would prefer not to comment on the bill. I have been out of town. I have not read it.

I will address my comment to the procedure for interagency consultation, and I would make the general observation that procedures are generally devices to handle certain problems, devices employed in certain context. In a moving situation such as the one we are dealing with today, the context changes, and procedures have to be kept up to date.

I have no problem with the notion that we should be taking another look at our interagency clearance and consultation procedures, to be sure that we are identifying the important commodities, and we are making the necessary judgments.

General Giller. I have two observations that do not address the bill directly. I personally find this general subject is probably one of the most complex, interactive, and with the least amount of true information available that I have ever run into in my Federal career.

I think one of the biggest problems is that it requires a true understanding of the international world, and the interactive aspects of the United States with that world, not just nuclear. Because it is part of it, it tends to be understood before one even thinks about a mechanism for the executive branch and the Congress to handle it.

I think it is rather important to understand more of the basics of the problems we have. Then we must adapt to the pragmatic world, and do the best we can, with the expectation that it will in fact improve the situation.

Senator Glenn. If you were sitting in my seat, and had to go back to your office this afternoon, and write something out to help make this situation right, are there suggestions you would have?

General Giller. I think that I would try very hard to get on the record, and we will try to help you with our following testimony, what is the real world situation. This requires lots of statistics and their interaction, and that is not easy to do.

Dr. Friedman. I think I gave the thrust of my main concern, and that is that whatever we do, we try not to do without recognizing the role that other supplier countries need to play.

I just ran quick count, and there are some 75 power reactors, either in operation, or construction, on order throughout the world, which are not being supplied by U.S. companies, or by U.S. technology, completely independent of the United States.

There are 75 nuclear power reactors throughout the world, over which we have no say, so we have to take the approach that we have to work with these other countries that build power reactors that supply material to share our concern, and to work with us in developing improved techniques.

Mr. Page. Senator, I have nothing to add, beyond what has already been said by the other panel members.

Mr. Larson. I do not have anything either. As a new organization, we are certainly attempting to determine our interfaces with the other agencies, and with other organizations, and so I would think we both have the same objective, that is, to find out what is the function to be performed, and in trying to determine how to carry out our role.

Senator GLENN. Let me say in closing, I appreciate very much your forthrightness, and your straightforwardness, and we will be submitting more questions to you, or maybe we will submit them to the agencies, particularly in regard to the possible Indian plutonium violation, the shipments to South Africa, and the computer setup. They all bring up questions regarding different aspects of approval.

I think we are fortunate to have a group like this here this morning before the committee.

I think in trying to regulate the whole nuclear field, and get it under control, you gentlemen here this morning probably represent the most experienced people in the world with respect to regulatory control. We do appreciate very much your efforts here, and we will be contacting you with other questions on this, to be submitted for the record, as we get into these considerations. I appreciate very much your being here this morning.

The committee stands in recess.

[Whereupon, the committee was recessed at 1:45 p.m.]

THE EXPORT REORGANIZATION ACT—1975

WEDNESDAY, APRIL 30, 1975

U.S. SENATE,
COMMITTEE ON GOVERNMENT OPERATIONS,
Washington, D.C.

The committee met, pursuant to recess, at 10 a.m., in room 3302, Dirksen Building, Senator John Glenn, presiding.

Present: Senators Ribicoff, Glenn, and Percy.

Staff members present: Dick Wegman, chief counsel and staff director; Paul Leventhal, counsel; Marilyn Harris, chief clerk; and Pat Donat, clerical assistant.

Senator GLENN. The committee will come to order. We are very glad to welcome some of the expert agency witnesses here today to follow the testimony that we had last week. I think that we had a very fruitful session last week, and we are glad to continue these hearings today.

As far as the order today in which we will take up the testimony of the various witnesses, we thought we would start with Mr. William Anders, Chairman of the Nuclear Regulatory Commission, and then have the executive branch as a panel, that is, Dr. Dixie Lee Ray, Assistant Secretary of State for Oceans, International Environmental and Scientific Affairs, and former Chairman of the Atomic Energy Commission; Dr. Robert C. Seamans, Jr., Administrator, Energy Research and Development Administration; John K. Tabor, Deputy Secretary of Commerce. Finally, we will hear Dr. Gerald F. Tape, U.S. Ambassador to the International Atomic Energy Agency.

Mr. Anders, we are delighted to welcome you here today, and perhaps you would like to introduce the other persons you have brought with you today.

TESTIMONY OF WILLIAM A. ANDERS, CHAIRMAN, U.S. NUCLEAR REGULATORY COMMISSION

Mr. ANDERS. Thank you, Mr. Chairman. I have two of my colleagues with me, Commissioner Kennedy, on my left, and Commissioner Gilinsky, on my far right, and then on my immediate right, Ben Huberman, one of our key staff persons working in this particular area.

Senator GLENN. Please proceed with your statement.

Mr. ANDERS. Mr. Chairman, first let me say that I am in complete agreement with the spirit and intent that motivates all of us to assure that peaceful nuclear export will be used for peaceful purposes.

The Energy Reorganization Act of 1974 assigned to the Nuclear Regulatory Commission all the licensing functions of the former Atomic Energy Commission, including the responsibility for issuing export licenses. These export licensing responsibilities are defined in various provisions of the Atomic Energy Act of 1954, as amended. These include sections 53 and 57—relating to special nuclear material; sections 62 and 69—source material; sections 81 and 82—byproduct material; section 103—commercial production and utilization facilities; section 104—facilities for use in medical therapy and research; and section 109—component parts of facilities.

The relevant provisions require the NRC, before issuing an export license for a nuclear facility or nuclear material, to determine whether issuing the license would be inimical to the common defense and security and—in certain cases—whether the export would be under the terms of an agreement for cooperation pursuant to section 123 of the act.

While the NRC has statutory responsibility for determining whether such licenses should be issued, authority for entering into and approving agreements for cooperation is vested in the executive branch and Congress. Moreover, the executive branch has the chief mechanisms, through its national security and foreign relations agencies, to gather the information and make integrated national policy assessments which the NRC must have prior to reaching its determination as to "common defense and security."

This allocation of responsibilities necessitates the development of effective working relationships between the executive branch and the NRC, so that the Commission can effectively—and independently—exercise its legal responsibilities and have available all of the information it needs in reaching its decision.

Mr. Chairman, I would like to depart from my testimony, and say that a previous witness, who I respect quite a bit, Mr. O'Leary, and who has served very well in the Atomic Energy Commission, indicated in the copy of the testimony I have that the NRC's job at the present is strictly a ministerial one, one of being a rubberstamp. I would like to assure you, we do not look at it that way. It is not the way we are conducting the operation at this time. It might have happened in the past, but that is not the way it is now.

We are in the final stages of developing new procedures with the executive branch. Our present intent is to workout guidelines spelling out the type of information which the executive branch will develop and assess and which will then form the basis for necessary NRC determination prior to issuing the export license. I visualize the guidelines as covering both specific questions—such as whether the United States has an agreement for cooperation with the recipient country—and more general information relating to matters, such as the adequacy of the recipient country's physical security arrangements, bearing on the export license request. All of this information and these assessments will permit a balanced judgment on the underlying issue—whether the export will be used exclusively for peaceful purposes and not diverted to military uses. I am confident the guidelines we are developing will provide a workable basis for coordinating the national security determinations required of the NRC with the executive branch's overall responsibility in foreign relations and the national defense. As soon as these procedures have been developed, but prior to their final approval, we will discuss them with the cognizant congressional committees, as I promised personally to Senator Ribicoff.

In the meantime, the NRC is working on the basis of interim procedures. Because there has been some comment from foreign authorities and in the press about NRC's present licensing practices, I would like to explain just what we are doing. As new cases come in, we are asking the State Department to furnish the NRC with the views of the executive branch on the "common defense and security" considerations referred to in the Atomic Energy Act.

The content of the information which the State Department is reviewing is of essentially the same nature as that being developed under the proposed NRC executive branch guidelines for the new procedures. Based on the information developed by the State Department in consultation with other executive agencies, the NRC will then make an independent determination in accordance with its responsibilities under the present law. In route cases, the Commission staff will take the necessary actions. However, in the more important cases the Commissioners themselves will review export licensing applications on a case-by-case basis at least during this transition period. We have established the following internal NRC guidelines for the staff's use in determining which cases will be referred to the Commissioners. For nuclear material exports, the Commissioners will review all applications having policy significance, as well as any license request involving over one effective kilogram of special nuclear material or over 10,000 kilograms of source material. In the case of production or of utilization facilities—such as power reactors—the Commissioners will review all license requests. Pending cases, which the AEC regulatory staff had received and forwarded to the Atomic Energy Commission's international security office prior to the establishment of NRC in January, will generally be handled according to the same guidelines as we have established for new cases. In these instances, the NRC staff will review the documentation developed by ERDA since the relevant ERDA office had begun processing the applications before the establishment of NRC. Should a review of that documentation suggest need for additional information, views of assessments, NRC will obtain them from the executive branch.

For import licenses, similar procedures are also in effect. The Commissioners will review all applications having policy significance, as well as any import license for special nuclear materials and any import license for more than 10,000 kilograms of source material.

These interim procedures have led to some misunderstanding in the United States and abroad to the effect that NRC has placed an embargo on nuclear exports. I want to state categorically that this is not the case. Let me repeat the Commission's statement of March 28 of this year.

> **Pending the completion of the presently active review of the regulations and the procedures which should be followed by NRC and other Government agencies regarding the licensing of exports, the Commissioners will review all export license applications involving reactors or significant quantities of source or special nuclear material.**

As I have already indicated, these interim procedures are somewhat more time consuming than the procedures in use before January, or the procedures we will soon establish in cooperation with the executive branch. However, they have not resulted—as some foreign sources have implied—in a cutoff of needed fuel supplies which the United States had earlier agreed to provide. We have already issued two major sets of licenses under the interim procedures, relating to exports to the Federal Republic of Germany and Japan.

We will continue to process license applications expeditiously under the interim procedures until the new procedures are in effect.

With regard to the proposed Export Reorganization Act, the Commission is now in the process of analyzing the proposed legislation and has not yet developed its formal position. We will, of course, be glad to provide our views as soon as we have completed our analysis of the provisions of the proposed legislation.

Senator GLENN. Thank you very much.

Do any of the other gentlemen at the table have a statement to make separately from yours?

Mr. ANDERS. No, they do not.

Senator GLENN. In line of past proceedings for the committee hearings, we would like to keep the first round of questioning to 10 minutes, and I have a couple of questions here to start off with. Then we will go the 10-minute route, and then have unlimited questioning after that, or questioning by other committee members who may be here today.

Mr. Anders, as your statement that the Nuclear Regulatory Commission must develop effective working relations with the executive branch to obtain all of the information necessary for the Commission to effectively and independently carry out its export licensing responsibilities—is this possible, and how can NRC make independent licensing decisions when you are totally dependent or nearly so on the executive branch for safeguards information?

Mr. ANDERS. Indeed, much of the information associated with the export licensing activities relates to the basic conduct of our foreign relations in this country. The NRC does not at the present have the kinds of mechanisms required to directly gather information related to such considerations. We are reliant to a large degree on information developed by various components of the executive branch. Though we would not go strictly on the information provided us.

We feel it is our responsibility under present law—the Reorganization Act, under the act of 1974, which this committee sponsored—to make an independent assessment, to aggregate this assessment, and draw our own conclusions as best we can.

Senator GLENN. I know in areas of policy, overall international foreign policy matters, that obviously you are dependent on information from other people, and we would not expect the NRC to come up with their own in-house State Department, in effect. But how about the technical area—the bodies to do the technical work involved? I believe past testimony has indicated that you felt, and probably other people also felt, that this was not an in-house capability you now have, and you are more dependent than you would like to be as an independent agency on ERDA for their technical expertise.

Would you comment on that?

Mr. ANDERS. This committee, in establishing the Nuclear Regulatory Commission and ERDA, clearly focused on the area of new and developing concerns relating to the questions of safeguarding the nuclear material.

You did this by establishing a separate and specific organization of nuclear materials safety and safeguards within NRC, with specific responsibilities which would not only be concerned with licensing but also would be the general focal point for all safeguard considerations, policy and technical review.

Quite frankly we have not been able to bring in this activity up to a level of staffing overnight which we think would be required for the future.

We have requests before the Congress—before different committees than this one—ones who might have a somewhat different view of this activity and resources required.

Indeed, we feel that the resources are adequate to do this sort of job an ad hoc basis at present. But, not enough to really get ahead and look forward to outlining a fully rational procedure for the future in the area of safeguards for this country internally, and relating to our international responsibilities under the law.

Senator GLENN. I obviously was not on the committee when some of these decisions were being made last year, and I am sure Chairman Ribicoff will be able to clarify some of these things for us. But in addition to testimony that has already been given, it has been my impression from studying some of these things that I heard here, that the NRC was set up, that these safeguards and other regulatory functions were split from the AEC, with the idea that they would be a completely separate and, as much as possible, handled autonomously, with your own in-house capability to make decisions, without having to rely on the executive branch of the Government for whatever information might or might not be given to NRC, as times and people change.

I am sure there has been a fine working relationship between you and EDRA up to this time, and the personal relationship between the people heading the groups there, might have something to do with that.

What we are interested in also is setting up the proper facilities within each organization to do its job, quite apart from whether there was a close personal relationship there or not. I think that is a prime consideration.

Mr. ANDERS. Senator, quite frankly, I would not want a responsibility like issuing export or import licensing, as important as it is, if it is strictly a rubberstamp operation.

Senator GLENN. In the South African development of potential new spray nozzle process for enriching uranium, as well as some of the other fuel-cycle techniques that are talked about these days—laser, and so forth—with regard to uranium enrichment, do you think we need to redirect or have a bigger safeguards capability than just the plutonium reprocessing, or uranium enrichment processes, that we have talked about so far?

In other words, we have talked mostly about security with respect to the handling of plutonium, and now we begin to see on the horizon whole new technilogical processes that provide new means of producing nuclear fuel and explosive materials. What I would like to know is whether these safeguards processes are adequate, or will we have to have a whole new area of capability of research to keep up with and control these new processes?

That is a rather involved question, but I think you get the gist of what I mean.

Mr. ANDERS. I think I get the flavor of it.

The technology of various enrichment schemes or processes, is the purview of the Energy Research and Development Administration, and, quite frankly, I am not well grounded in that area.

You mentioned plutonium recycling, that is a question that is before the Nuclear Regulatory Commission at this time. We have not reached our conclusion. Here we must operate in a judicial posture, and it would be inappropriate for me to suggest how we might come out on that one way or the other. But, certainly if the finding is positive, that is, in favor of recycling, it would have to be contingent upon an adequate set of domestic safeguards. With regard to international nuclear power, questions any interaction that the United States might have, vis-a-vis the export of material or technology transfer, is essentially the same kind of considerations would have to apply.

Senator GLENN. There have been some questions raised as to whether, under the Export Reorganization Act, whether this would improperly authorize NRC to withhold a nuclear export license that is favored by the President. That is a very politically sensitive area, obviously. Would you care to comment on that?

What if it came down to something that might be advantageous in the foreign policy context, and yet you felt that there were not adequate safeguards. That would be a tough call, I am sure, but what would be your policy on that?

Mr. ANDERS. Senator, I am not a constitutional lawyer, but it seems to me, and to the Commission, that the Energy Reorganization Act of 1974, does give final responsibility and authority for issuing export licenses to the NRC and, under the law, we have to implement our responsibilities accordingly.

Chairman RIBICOFF. Will the Senator yield?

Senator GLENN. Yes, certainly.

Chairman RIBICOFF. I think Senator Glenn makes a very important point. We have run into this, especially over the years in trade legislation, where Congress has found time and time again that the State Department would subordinate American trade matters, economic matters to their geo-political concerns—to the disadvantage of the United States. And we have tried to write into the 1974 trade act some safeguards against the dominance of the State Department, and in all due respect of the State Department, they are not all wise in many of these fields. Nevertheless there has been a tendency on the part of all other Government agencies to defer to the State Department.

Now, what I believe, Senator Glenn is expressing his concern on policy matters; should the State Department take a position contrary to yours, would you defer to them because they felt some international relations that they had in mind mitigated toward giving a nuclear export license? I am curious as to how you would react to that.

Mr. ANDERS. In the process as I envision it it now, and, this will be put to work in the near future, it is quite conceivable that at least in the initial round of interaction between us and executive branch there may be some difference of opinion, or lack of information that we would feel necessary, concerning adequacy of safeguards or of another country's intent with regard to nuclear weapons development.

We may well have to go back and request additional information. I would suspect that in that process, our views or inclinations would be able to be read by those who we are dealing with in the executive branch, which may or may not influence their particular view, but it could. I think that in the final analysis confrontation would be the exception rather than the rule, but if it came to that, then the Energy Reorganization Act, as I read it, and as my colleagues read it, gives NRC the responsibility to make the final decision.

Chairman RIBICOFF. What is important from my experience with the executive branch, and the legislative branch, is that men of capacity and ability use their capacity, ability and knowledge, and not always defer to somebody else who may not have their knowledge and experience, whether it be in the White House or in some other branch of Executive Government.

I think there is an inclination that most people in the executive branch do compromise their intellectual integrity to defer to a telephone call from somebody down at the White House who cannot hold their briefcase when it comes to nuclear problems or someone in the State Department who does not have their knowledge or backup. It becomes very important in a matter of such grave importance as to how you discharge your responsibility. I am glad that Senator Glenn opened this up, because this becomes a matter of great seriousness.

Mr. ANDERS. Senator, I just read the law that we are suppose to operate under a law that was passed by the Congress, and signed by the President, and it tells me quite clearly what my duties are.

Chairman RIBICOFF. Let me ask you this followup question, what would you do if you come to a decision that a license should or should not be granted, or a safeguard would not be adequate, and you got a call from some kid down at the White House—and I use that word "kid" advisedly—or somebody at the State Department that tells you to the contrary?

Mr. ANDERS. We would have to operate under our own judgment, Senator. We have come to the conclusion at the Commission, that if we determine that an export license request is not appropriate, that would be our decision.

Chairman RIBICOFF. I would hope you would carry it out. I think there is no reason to have the conflict, but I think many of the problems we have domestically, and internationally, is the unwillingness for men of ability and intellect to go to the mat on some of these basic issues.

I am not talking about the usual housekeeping problems, but some basic policy questions.

Mr. **Anders**. Now, as to the country's international relations, we will not be capable of making a broader policy assessment relating to other things that nuclear export would only be a small part of.

Indeed such foreign policy determinations are the job of the President, as I see it. But, as the law is written today it gives the responsibility to the Nuclear Regulatory Commission. Therefore, we must make a substantive finding.

Chairman **Ribicoff**. Well, from my standpoint, as we set up this agency, this was our intent; and I would hope that you would keep that in mind—that that is your charter under which you work—and not to hesitate to take your position and hold it.

Senator **Glenn**. I think in a bigger context, one discussing what is being proposed with this bill, I think it was sort of in a context as being a check and balance, which is inherent in our whole system, or it is supposed to be, and this would present, it would perhaps be a safeguard of our own, of our own constitutional system really, of a President going to a foreign country, and just promising a nuclear plant without adequate safeguards, as we have had a little bit of experience within the past few years.

So, in a way it is a check and balance, and my original question was along the line of whether you have the means right now to do that independently, with independent judgment, quite apart from being dependent on the executive branch or ERDA, which might be under duress from a Presidential directive, more so than you would be as an independent agency. That was our concern in putting this bill in: to preserve the function of checks and balances.

Chairman **Ribicoff**. I have a bill that I have to handle on the floor at 10:45 this morning, so if you will pardon me, I have some questions, and, Senator Glenn, you may ask them for me.

Senator **Glenn**. Thank you, Senator Ribicoff.

I have gone over my time. I did not realize Senator Ribicoff had to leave, but I will ask the questions prepared here at a later time period. We have gone over our time here.

The Senator from Illinois.

Senator **Percy**. Did you wish to say something, Mr. Anders?

Mr. **Anders**. I just wanted to respond to the point that Senator Glenn was making as to checks and balances. The export and import license is a long way down the trail on various agreements with other nations.

By the time we receive a license request there is a lot of water that has gone over the dam, so to speak.

The responsibility for developing agreements of cooperation between other countries is within the executive branch as specified by Congress. These agreements, I believe, are part of our Nation's foreign policy are sent to Congress for review, as are the amendments. So, by the time the NRC receives a specific request for a license it seems to me that the intent of the Government has been generally indicated.

Senator **Glenn**. I would not anticipate, though, that the executive branch of Government would be doing their negotiating in a vacuum, without consulting you and keeping you informed as to what is going on as negotiations are in progress.

You pointed out your function and this actually comes a long way down in the process for final approval of the licensing, but I would think that it would be absolutely foolish for anyone to bring a license negotiation clear to that point, without you being kept informed all along the way of what was going on, so that they had a pretty good idea of whether you were going to approve or disapprove that license.

You would have the final authority, that is true, but certainly no one would be foolish enough to take license negotiations clearly down to that point without having a clear indication of whether you plan to approve or disapprove.

Mr. ANDERS. I am pleased to say we have received a letter recently from Dr Kissinger, requesting the Nuclear Regulatory Commission to become more involved in those areas. I would be pleased to submit that for the record.

Senator GLENN. All right.

[Information referred to follows:]

NATIONAL SECURITY COUNCIL
WASHINGTON, D.C. 20506

April 29, 1975

MEMORANDUM FOR

THE CHAIRMAN
NUCLEAR REGULATORY COMMISSION

SUBJECT: Annual Report to the President on Domestic Nuclear Safeguards

The President requested in a memorandum of April 27, 1974, that the Atomic Energy Commission, in coordination with other agencies, submit an annual report on the effectiveness of the nuclear safeguards systems, program developments, and related recommendations regarding the domestic control and security of nuclear materials and facilities. Following the Energy Reorganization Act of 1974, the Energy Research and Development Administration, working with other Executive Branch agencies, has undertaken the preparation of this report. Since the NRC has extensive responsibilities in domestic safeguards, your contribution to the annual report would be most valuable. The President has indicated that he would welcome the contribution of your staff and the comments of your Commission in developing this annual report on domestic safeguards, and would hope that your organization would be prepared to participate.

Brent Scowcroft
Henry A. Kissinger

cc: The Administrator, Energy
Research and Development
Administration

Senator **Percy.** Mr. Anders, we appreciate your being here this morning. As you know, this committee put a great deal of time in the Energy Reorganization Act of 1974, and we have no pride of authorship at all. It is a good procedure to occasionally check on reorganization matters that we create here, in the law, to make sure that they are working, and to revise them as we go along, and possibly seek interpretations and make legislative history if there are points of confusion on them.

I think this is a good chance to do it. We have not anticipated so quickly changing our export procedures. When we started this study, we had anticipated originally that it would lead to legislation which we have now embodied in the Export Reorganization Act for your consideration. But as we went through this study, it seemed that in order to tighten up our safeguards procedures, some reorganization might be desirable. But, again, we offer it for suggestions and thoughts.

You indicate in your testimony at the bottom of page 4, that the Commission is now in the process of analyzing the proposed legislation, but that it has not yet developed its formal position.

Do you have any idea how long a period of time might elapse before you will formally come up with a recommended position?

Mr. **Anders.** Within a week or so, Senator.

Senator **Percy.** Could we then have that. Rather than your again coming before the committee, could it be submitted to us in written form?

Mr. **Anders.** Yes, sir.

Senator **Percy.** And we can take it in the context of your testimony here.

On page 2 you indicate that you are seeking a reorganization of the NRC decisionmaking procedures to the end that export will be used, in your words, exclusively for peaceful purposes, and not diverted to military uses.

Can you review for us what procedures are used in, say, the shipment of materials to South Africa? What controls do we have over their transshipment of materials, let us say, to the Mideast, or shipments made from South Africa to any countries in the Mideast, which obviously is a very sensitive area right now.

Mr. **Anders.** You have asked some questions, which I do not have all of the answers for at the moment, Senator.

I am sure they are available. But, I do know that there is an agreement of cooperation between the United States and South Africa which was established July 8, 1957 and modifications, and other agreements relating to cooperation and exchange of technology, were approved as late as May 22, 1974.

The basic elements of these agreements of cooperation demanded by the Atomic Energy Act demand very tight control over the accounting and reshipment of the agreeing nation.

I will have to go back and check the details of what has actually transpired and submit it for the record, but there has been no violation of the agreement, as far as I know.

There is an export request before us which we are processing. It is one in a series related to the refueling of a research reactor. This request is in the process and it will not be appropriate for me to comment upon it at this time.

[The information requested follows:]

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

JUN 6 1975

GOVERNMENT OPERATIONS COMM.
RECEIVED
JUN 30 1975
WASHINGTON, D.C. 20510

Honorable John Glenn
United States Senate

Dear Senator Glenn:

During my appearance before the Government Operations Committee on April 30, 1975, Senator Percy asked me to supply for the record information on U.S. nuclear fuel and facilities shipments to South Africa and re-exports by South Africa of U.S.-supplied fuel and facilities. Attached is a compilation of data on the above questions:

-- Attachment 1: Data on the U.S.-supplied SAFARI-I research reactor.

-- Attachment 2: Fuel shipments of high-enriched uranium for use in SAFARI-I.

-- Attachment 3: Re-exports by South Africa of U.S.-supplied fuel for use in SAFARI-I.

-- Attachment 4: Data on U.S.-supplied low-enriched uranium shipments for use in the South African critical assembly at the National Research Center at Pelindaba. All of this material was re-exported to the U.K. and from there returned to the U.S.

I hope this information will be helpful to the Committee.

Sincerely,

William A. Anders
Chairman

Attachments:
As listed above

AMERICAN REVOLUTION BICENTENNIAL
1776-1976

ATTACHMENT 1

U.S.-SUPPLIED SAFARI-I RESEARCH REACTOR

REACTOR TYPE: Oak Ridge Research Reactor (tank), fully enriched (90%) uranium, light water moderated and cooled, beryllium reflected.

POWER: 20 MW thermal: Initially 6.67 MW cooling capacity.

LOCATION: National Nuclear Research Center, Pelindaba, near Pretoria, South Africa.

OWNER: South African Atomic Energy Board

DESIGNER/BUILDER: Reactor: Allis-Chalmers Manufacturing Co.

Building, process equipment, etc: Atomic Energy Board and South African Firms

CONSTRUCTION: Start of Construction: 1961
Reactor Critical: 1965

Typical operating core consists of:
22 fuel elements
5 control rod elements
22 Beryllium reflector elements
23 Al filler pieces

*With the present schedule of operation at 20 megawatts thermal operating 5 days a week SAFARI-I requires a reload every 3 weeks, when 4 new elements of 200 gm U-235 each are loaded. Every 6 weeks 1 new control rod containing 135 gm of U-235 is loaded. Over a period of 1 year taking in account a total of 10 weeks shutdown time, the reactor requires an average of 14 reloads of fuel elements and 7 reloads of control rods. The annual requirement is therefore 56 times 200 gm elements and 7 times 135 gm control rods giving a total of 12.145 kg of U-235 contained in 13.494 Kg uranium at 90% enriched.

Data from: Directory of Nuclear Reactors
Volume V
Research, Test and Experimental Reactors
Page 95.
Published by : IAEA

* Supplied by South Africa

May 22, 1975

ATTACHMENT 2

U.S. - SUPPLIED URANIUM FOR SAFARI-I RESEARCH REACTOR

The following is a list of shipments of highly enriched uranium supplied to South Africa for the operation of the SAFARI-I research reactor. All material was supplied in the form of finished fuel elements by the fabricator. Material supplied by the UKAEA was of U.S. origin, originally shipped to the U.K. specifically for fabrication into SAFARI-I elements. Its subsequent transfer from the U.K. to South Africa was authorized before the fact by the U.S.

DATE	U	U-235	FABRICATOR/SHIPPER
Feb 65	4.315	3.874	Babcock & Wilcox
May 65	3.446	3.096	Babcock & Wilcox
Oct 67	2.526	2.273	UKAEA, Harwell, U.K.
Nov 67	8.299	7.469	" " "
Dec 67	2.541	2.286	" " "
Dec 69	7.558	6.802	" " "
June 70	5.767	5.190	" " "
Dec 70	.975	.878	" " "
July 71	13.334	12.001	" " "
Sept 71	.663	.596	" " "
May 72	.971	.874	" " "
Dec 72	4.641	4.177	" " "
June 73	2.139	1.925	" " "
Aug 73	3.167	2.850	" " "
Apr 73	.300	.270	" " "
Oct 73	3.089	2.780	" " "
Jan 74	5.217	4.696	" " "
Apr 74	3.691	3.322	" " "
May 74	3.092	2.780	" " "
June 74	3.530	3.177	" " "
Nov 74	4.299	4.006	U.S. Nuclear, Inc.
Dec 74	3.437	3.203	" " "
Mar 75	3.444	3.209	" " "
Apr 75	4.879	4.552	
TOTAL	95.320	86.288	
Less Returns	(34.251)	(28.154)	
Less Burnup thru 12/31/73	(11.473)	(13.897)	
Less Burnup 12/31/73 to 4/30/75 at 0.333 kg/mo.	(5.33)	(6.460)	
Inventory	44.263 kg.	37.777 kg.	

May 22, 1975

ATTACHMENT 3

RE-EXPORT BY SOUTH AFRICA OF U.S. - SUPPLIED FUEL USED IN SAFARI-I RESEARCH REACTOR

Shipments to U.K.

U	U-235	
3.039	2.465	
.019	.015	
11.055	9.183	
.421	.320	
(.213)	(.220)	*
4.989	4.134	
.457	.327	
.034	.041	
3.306	2.711	
6.293	5.233	
29.400	24.209	At least 11.300 kgs of this amount has been returned to the U.S.

Shipments to France:

U	U-235		
4.851	3.945	Returned to the U.S. 7/30/74.	
34.251	28.154	TOTAL RETURNS	34.251

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* Adjustment to reflect the difference between computed and measured burn-up.

May 22, 1975

ATTACHMENT 4

U.S.-SUPPLIED FUEL FOR CRITICAL ASSEMBLY, NATIONAL RESEARCH CENTRE, PELINDABA, SOUTH AFRICA

This South Africa-built critical assembly was used in the study of reactor physics, including reactivity effects, reactor kinetics, pile noise analysis and control methods. It was constructed at the National Nuclear Research Centre, Pelindaba, near Pretoria, South Africa, using components of an exponential facility which was dismantled. It was used as an unreflected critical facility using four fuel elements containing 2% enriched uranium as driver elements. The fuel was manufactured by NUKEM, Germany, using U.S. supplied UF_6. The critical assembly has been decommissioned.

Shipments of Uranium metal spheres from Germany to South Africa: From Lease Account GE/ML/16-15 to LEASE ACCOUNT SA/ML/3-2.

Shipment No.	Date	Kgs. U	Kgs. U-235	
1	Aug 66	64.984	1.294	
2	Sept 66	65.586	1.307	
3	Sept 66	66.682	1.328	
4	Sept 66	67.179	1.343	
5	Nov 66	67.989	1.355	
6	Nov 66	67.863	1.352	
7	Dec 66	67.941	1.353	
8	Dec 66	67.989	1.355	
9	Dec 66	59.371	1.187	
10	Dec 66	4.416	.088	
Adjustment	-	.088	.002	
11	Mar 67	6.675	.133	
TOTAL		606.763	12.097	
Less: Transfers Out		(605.532)	(12.062)	1/
Less: Consumption		(.928)	(.012)	
BALANCE:		.303	.023	2/

1/ Transferred to U.K. for reprocessing. 602.522 Kgs U and 11.954 Kgs U-235 were returned to U.S. on September 8, 1971.

2/ Purchased by South Africa as unaccounted losses.

May 22, 1975

Senator PERCY. Last week we received testimony that the licensing functions consumed exactly one-half man-year.

That would seem to be a very small personnel complement, to be admired for a Federal bureaucracy, but also of some concern as to whether or not we have an adequate function there.

What is the size of the NRC's licensing staff and its professional and technical competence?

Mr. ANDERS. We have just been informed by 50 percent of our staff that we have two people who are dedicated to this activity. But I must say, Senator, that with the recent involvement of the Commission, our effort certainly represents more than several man-years in the short time we have been in business.

Clearly if the intent of the Energy Reorganization Act is to be satisfied, and if we are going to proceed with the kind of efficiency that I think the agreement mentions and the industry deserves, we are going to have to get a better overall operation than that.

Senator PERCY. Along the lines of our chairman's questions, I am not sure that I am clear as to your own intention in the future, for providing for your own analytical staff, so that you can take information provided to you by the State Department and by ERDA, regarding export licenses, and then analyze it, appraise it, and reach your own independent judgment, fitting for an independent agency.

Could you clarify a little bit how much faith you feel you can place on the material you receive from the executive branch of Government? Whether or not you are prepared to assume full responsibility for your own decisions? Once you have taken that material into account, and put into it your own analytical appraisal and study, it might be that 90 percent of the time the material you receive is absolutely adequate, and may be 10 percent or 5 percent, in which a mistake might be made. Can you tell us about that?

Mr. ANDERS. I think you put your finger right on the dilemma, that is an interesting question that is before the Commission right now, Senator.

I believe we have to operate on a very high measure of faith within our Government. The NRC has the responsibility to work within the Energy Reorganization Act and to issue export licenses. We do not have the vast resources required to gather information relating to the determinations that somebody has to make on the adequacy of the recipient country's ability to receive this material. I would expect that in certainly 90 percent of the cases, maybe closer to 100 percent, we would have sufficient confidence in issuing a license based on assimilation and assessment of the information we receive from the executive branch.

I worry though about the tough call, and how much we should not only aggregate the information received, but actually get down and check it ourselves. Here you run into the question of what is the rightful job of an agency with a major domestic focus in nuclear activity, an agency with enough problems to solve at home. This raises the question of the appropriateness of the NRC in the business of verifying, or gathering information overseas, some of which is the responsibility of the other nations.

There is a fundamental issue here that we all need to think through more. These hearings will be helpful to not only me, but to all of us, in getting a flavor of the intent of the farmers with regard to the details of the Energy Reorganization Act. The intention was to the full ultimate responsibility of that decision. We want to be organized, and to set up the Commission in such a way that the buck stops there, as far as these matters are concerned.

I have filed a rather lengthy report on the Mideast, 91 pages, with the Foreign Relations Committee, within the last week or so, following my trip out there.

A large part of it, I felt, was my deep concern about whether policy has been established as to what we are doing in the way of selling arms all over the world.

I can speak with some feeling on the industrial military complex. I know always the tremendous pressure to move and sell the goods that are coming off the line. I saw planeloads of people from industrial and military complexes, whether they be military, from our own Department of Defense, or commercial people from all over the United States, selling in the Arab oil, and selling all over Israel, all over the Mideast, to Israeli and other countries our most sophisticated weapons. This makes you sometimes really wonder whether the commercial end of America has not taken over and gotten us away from sitting back and saying, what is the consequence going to be of our arming both sides so extensively; what would be the fifth war in the Middle East? I think with even greater consequences, we have to look at our nuclear energy, and nuclear power, to see whether or not we are emphasizing too much the commercial, whether the sales department, or whether the control and regulatory end is actually the top drawer in the matter.

Could you comment on whether or not there is a commercial bias in your judgment in the export licensing process? Do commercial considerations predominate over regulatory considerations, assuming that NRC takes over the regulatory decisionmaking procedure for ERDA with respect to exports, and in what way can it be insulated from commercial pressures in deciding whether safeguards abroad are sufficient to permit a license to be issued? Could you give us your policy statement on that?

Mr. ANDERS. The basic, shortest answer is no. In looking ahead to the kinds of questions we would ask of the executive branch, relating to the appropriateness of the license, none of these in my mind are related to commercial aspects, though I do think we owe it to those we regulate, to at least give efficient service processing their application. Quite frankly, we are not now very efficient and are moving along on an ad hoc basis. A major purpose of the Atoms for Peace program was to internationalize the interest of other nations who did not have nuclear technology, and to get them to turn away from private nuclear development which, of course, could well lead to nuclear weapons development on their own.

Some have done this, and we need to get others to join in the beneficial aspects of the nuclear activity under international agreements such as the NPT, with safeguards worked into them. A key feature of the NPT is embodied in Article 4 which essentially gives to all parties of that treaty the right to the use of nuclear energy for peaceful purposes without discrimination. Therefore, we have to be careful in the various agreements that this country has signed, for nuclear fuel, for nuclear power, to not on the one hand seem to correct what is perceived by some to be a safeguards problem, while at the same time, encourage nations to go it on their own due to lack of reliability in the U.S. supply of nuclear fuel.

It is a delicate matter, sir.

Senator PERCY. When I ask the next question, I would like to precede it, by stating that, as a trustee of the University of Chicago for 25 years, I certainly have followed nuclear chain reactions and what happened under the Stag with deep interest, and I have been deeply involved in Argon, Octavia. In Illinois, I suppose we have been more dependent for electrical needs, and so forth, on nuclear energy than any other State in the Union. A third of our electricity comes from nuclear energy, and we have had a truly remarkable relationship I think with the Atomic Energy Commission. I have felt that our public utility, Commonwealth Edison, and others have done an outstanding job and worked very closely with the Commission, and had a harmonious and fine relationship with them. For the most part, I think our safeguards program has been extraordinarily good and well worked out, so I have seen first hand how we can with improvements move ahead. I have met with environmentalists for 9 years who have protested of nuclear plants, and for the most part, we have worked out our difficulties and problems, I am concerned, however, about the casualness which others somewhat less sophisticated might approach this problem, and I am concerned as to whether or not plutonium reprocessing is being carried on with the same degree of caution with regard to theft and diversion, and so forth.

Has there been any thoughts given to any kind of moratorium on plutonium reprocessing, and until such time as safeguards are equal to the threat of tests and diversion, what is your own thinking in that area?

Mr. ANDERS. Senator, there essentially is no plutonium reprocessing at this time. As you know, the various power reactors in Illinois and the rest of the country do breed plutonium in the business of producing electricity.

I must remind the committee that plutonium recycle is an issue before the Commission. The Commission has not made a finding on plutonium recycling. Therefore, it would be inappropriate for me to take a stance one way or the other at this time. It would not be fair to the parties involved on both sides of the issue.

I would say though that we have received a correspondence from the Counsel on Environmental Quality, that did suggest that the review procedure relating to safeguards aspects of the environmental impact statement being followed by the Atomic Energy Commission, was not adequate in that it did not take into account a cost benefit associated including safeguards costs. CEQ's recommendation was to include safeguards considerations before the Commission made a determination. We expect to announce our findings on this point in the very near future.

Senator PERCY. Thank you, Mr. Chairman. My time is up.

Senator GLENN. I will get into the questions that Chairman Ribicoff left with me here, and ask some of these here.

What specific recommendations, what specific situation led to the NRC to make its original announcement last month that no additional nuclear export-import licenses would be processed pending a review of recent regulations and procedures? Can you explain that?

Mr. ANDERS. We were concerned that there was so much misinformation around, some of it which we were responsible for, that related to the issue of the export licensing. There have been several stories in the press indicating that the Nuclear Regulatory Commission had put a ban on exports.

This was and is not the case. I must say that we were not proceeding at a particularly efficient rate but, we were proceeding. We have had this issue under review. Our main activity has been directed at developing the various modes of interaction with the executive branch. The actual processing of licenses has been given somewhat a lower priority. But where there was a critical need—the licenses were being brought up for review. In summary, our release was not issued on the basis of any new concern over safeguards. It was issued because of the bum information that seemed to be around.

Senator GLENN. If the Nuclear Regulatory Commission assumed the safeguards role, as provided in the Export Reorganization Act, would you favor the Commission having an international inspection role, assuming it could be done unobtrusively now through normal diplomatic channels?

That is a big assumption, but I realize that is a question anyway, if it could be done, would you see yourself as an international inspection team, or participate in such activities. I presume this would also be apart from IAEA?

Mr. ANDERS. Well, that is a big assumption, Senator, and I guess I do not have a view on that at the moment.

We could reflect on the general question. It seems to me, as I said earlier, that as important as the international safeguards question is, the main intent of the Energy Reorganization Act, the main focus, the main discussion, was with regard to domestic health, safety and safeguards for domestic nuclear power. That is the way the NRC is currently organized. That is the way we are mainly staffed. One wonders if that is not really our main function, if we elevate another function into importance, something has to give since we do not have an underutilyzed staff. I would hope that we could come up with procedures that would use the capabilities of the executive branch. Even that would relate to their more natural functions with regard to gathering information on foreign policy, and so as not to duplicate that capability ourselves.

Senator GLENN. As a followup on that question, which Senator Ribicoff left with me, I think it puts its finger on something very, very important. We are talking about regulations, international agreement. What followup means do we have that these conditions will be met?

If we are not inspecting unobstrusively through diplomatic channels, who is inspecting? How do we know what is going on? Are we to rely completely on IAEA? That is really the heart of the question, and that is a very serious matter.

That is the heart of the question as to what we license or do not license. Part of it is done on faith. Part of it cannot be done on faith, and if it is not done on faith, what can we do?

Mr. **Anders.** I guess we have to bring the discussion around to whether the United States should provide leadership. I would say we certainly must.

The IAEA has been the instrument used to insure the safeguards to date. Ambassador Tape is here today to speak to that and he can speak much more eloquently on the subject than I can. Also, I understand that ERDA is currently inspecting various facilities in other countries. I would think that this is a more natural function for them than for us.

Senator **Glenn.** Another question here that gets into something that is not of everyday concern, perhaps, but we have all talked about the possibility of nuclear blackmail threats by terroist groups. Maybe this is a question that does not address itself here only to NRC or ERDA, but perhaps to the whole Defense Department as well—are there plans, are we prepared to deal with, the nuclear blackmail threat right now?

Say we had news that came in at this moment that somebody said they have an atomic bomb in a box in Kennedy Airport, and they will blow it in so many hours. Would you be involved?

Are there plans to really deal with that in place, or is this to be considered on a moment by moment basis?

Mr. **Anders.** There have been seven nuclear threats in this country. I have been involved in two of them while at the AEC. Those are trying times. There are procedures to handle them.

I would like not to go into details of these procedures in open session.

Of course all the procedures of the Nuclear Regulatory Commission are under review. Since the split up of AEC we have not had time to review and update all of them, but the essence of the procedures of the past continues to be functional. We will be looking at this in other areas as time permits.

By the way, I would like to underscore that all of the threats that we have had have been hoaxes.

Senator **Glenn.** Thank you.

Would you, as the last question for Senator Ribicoff, do you have any comment to make on your budgeting process, do you believe that NRC should be more independent of the executive branch budgeting process than you are now?

That gets at the heart a lot of things, I realize, and it is a very crucial aspect of whether you are able to carry out your duties.

Mr. **Anders.** Let me answer by saying that the executive branch and the Office of Management and Budget have been very straightforward and open with the NRC.

I have been involved in several executive agencies since I have been in Washington, including NASA. The budget process for these others has been much more strenuous, if you will.

The budget that the Nuclear Regulatory Commission has before the Congress—the fiscal year 1975 supplemental—is one on which we desperately need to get through our transitional mode that was started by the enactment of the Energy Reorganization Act. The fiscal year 1975 supplemental budget, and the 1976 budget are budgets that were prepared and locked up, if you will, before the Nuclear Regulatory Commission was even on board, which was on January 19.

My colleagues had no chance to participate in that budget process. Dr. Ray and I and the other AEC Commissioners, did the best job we could to understand what the intent of the Energy Reorganization Act and to understand what the new responsibilities might require in the way of resources.

We did not have a perfectly clear crystal ball. As we, the NRC look back, we can see there are areas that may need some beefing up.

At the time of our fiscal year 1976 budget final agreement, the OMB and the President took what was a rather unusual step in Washington, they said in writing that the Administration would entertain an amendment to the fiscal year 1976 budget after the Nuclear Regulatory Commission had a chance to review its responsibilities and justify additional resources.

We are working on this, and expect to go forward shortly.

Senator GLENN. Last year, as background for the record, late last year, the Government Operations Committee reported out legislation to allow all independent regulatory agencies, including NRC to make simultaneous budget recommendations to Congress, and I think similar legislation is now pending before Congress. It has not been passed.

Last year, OMB rejected an AEC request for $13-million supplemental appropriation to upgrade regulatory safeguards, and this was after GAO made reports critical of AEC safeguards that called for upgrading of safeguard efforts.

So there is legislation pending before Congress now to make independent regulatory agencies more independent in their budget requests. I do not know the exact status of the bill, but I believe it is in committee now, on simultaneous, direct submission of budgets.

Mr. ANDERS. Senator, there has been the practice demanded by the Joint Committee on Atomic Energy for the AEC to submit its staff budget requests directly to them. I believe that procedure is still in effect.

Senator GLENN. Some of these questions I had were already covered to a degree by Senator Percy, but just a couple here, and then we will end, because we will let our time get away from us with the other witnesses that are waiting here now.

Do you feel there should be a moratorium on plutonium reprocessing?

Mr. ANDERS. Well, Senator Percy went directly to that question, and the best I can do is repeat what I said before, and that is a question that is before the Nuclear Regulatory Commission. We are a judicial body, we are guided by the Administrative Procedures Act, and it would be inappropriate for me to take a position until the Commission has made a finding on this contested issue before us.

Senator GLENN. Do you think you could describe briefly so time does not get too far gone, any differences between the role NRC sees itself playing in issuing domestic licenses, as opposed to licensing nuclear exports. Are there substantial differences that you apply, other than just State Department considerations of course, but as far as safeguards, other specific requirements—are there essentially differences between your granting a domestic license, and an export license?

Mr. ANDERS. The domestic licenses are construction permits and operation permits for nuclear fuel, or power facilities. They are of quite a different nature than the questions you asked for on the export and import licenses in that they are mainly related to public health and safety and domestic safeguards.

Senator GLENN. Do you apply the same criteria to exports as you do to domestic licenses, as far as safeguard criteria are concerned?

Mr. ANDERS. I would think that the requirements should be similar, and certainly meet the need or the threat or the possible threat, that could develop in a foreign country.

As to whether the requirement should be exactly equivalent—probably not. This is because every nation has a different procedure, different modes of operation and different kinds of threats. But the procedures do have to be adequate for the problem.

Senator GLENN. Do you have any other statement you would like to make, before we change witnesses here?

Mr. ANDERS. None except to say that we would like to reiterate again that we have read the Energy Reorganization Act of 1974 and believe we understand it in general. Frankly, all of us are trying to understand the intent better in particular. Until we are told otherwise, we plan to move toward implementing our responsibilities reflected in that act.

Senator GLENN. I think the intent of the split made of the AEC was along the lines that would give the safety monitors the dependence that they felt was needed, and I think that is the intent that all of us are concerned about, that we regulate this not only domestically, but internationally also, and that is the intent of this whole thing, and I appreciate your testimony.

We will review the record, and see if there are any other questions we would like to submit to you in writing.

Mr. ANDERS. Thank you.

RESPONSES TO QUESTIONS SUBMITTED BY SENATOR RIBICOFF TO WILLIAM A. ANDERS

Question 1(a): To what extent have...safeguards been upgraded over the past year?

Response: Improvements that have been made in safeguards through May of this year are contained in the attached report, "Upgrading of Safeguards Since November 1973."

Question 1(b): How do international safeguards generally compare with safeguards in the United States?

Response: The IAEA safeguards program has the same elements for material control and accounting as the United States program:

- A measurement system for determing flow and inventory
- Means for evaluating measurement accuracy
- Procedures for identifying and evaluating shipper-receiver differences
- Procedure for taking physical inventory
- Procedure for evaluating unmeasured inventory and losses
- A system of reports and records for each material-balance area
- A means of checking accounting procedures
- Procedure for submission of safeguards reports to the agency
- Five-year record retention
- Agency inspection to verify safeguards performance

The similarities in the U.S. and IAEA systems are not surprising, because the United States helped design the IAEA material control and accounting system. However, the objective of the U.S. and IAEA systems are different. The U.S. system is designed to protect against, deter, and detect theft or diversion of nuclear materials that have military or health and safety significance whereas the IAEA system is designed principally to detect diversion of nuclear materials that have weapons significance.

Differences also exist in the detailed application of these programs. United States regulations contain specific, detailed requirements governing safeguards performance capability; the IAEA does not have similar requirements. Examples of such U.S. requirements include inventory frequency (Section 70.51(e)(3) of 10 CFR Part 70); constraints on measurement uncertainty (limits of error--Section 70.51(e)(5)); the necessity of using measured values for physical inventories (Section 70.51(f)(1)); and action required if material unaccounted for exceeds certain limits (Section 70.53(b)(1)).

Although the IAEA has no responsibility for reviewing national physical security programs, it issued guidelines on physical security in March 1972, when a panel of experts working under IAEA sponsorship prepared a report entitled "Recommendations for the Physical Protection of Nuclear Material." Another panel was convened in April 1975 to update these recommendations.

Question 1(c):	What remains to be done?
Response:	In the area of domestic safeguards the NRC staff is working internally and in conjunction with the Executive Branch to develop proposed controls on access to special nuclear material, vital equipment, material control and accounting records, and safeguards plans, and to determine appropriate requirements for investigation and clearance of personnel who have such access. Legislation enacted August 17, 1974 (P.L. 93-377) authorized the Commission to require

security clearances for individuals who may have access to or control over special nuclear material. If such a program were implemented, these controls and requirements would be analogous to those in effect for some 30 years at Atomic Energy Commission facilities to protect information and materials classified in the interest of national security.

The NRC is evaluating plans for other safeguards upgrading actions that were initiated prior to formation of the Nuclear Regulatory Commission. The NRC is also conducting a study, as called for in the Energy Reorganization Act of 1974, to assess the need for and the feasibility of establishing a Federal security agency for the performance of safeguards functions. This study will be prepared and transmitted to Congress early in 1976. NRC is also conducting a number of special safeguards studies in connection with the NRC review of plutonium recycle issues.

In the area of international safeguards, international accountability standards need to be developed and agreed to and the IAEA should apply more definitive criteria in evaluating the acceptability of a State's safeguards system. Also, clearer international standards in physical security are needed. These can take the form either of bilateral understandings or of an international convention on physical security.

Question 2: Please describe the specific differences between the role of the NRC in issuing domestic nuclear licenses and in licensing nuclear exports with respect to safeguards.

Response: In issuing domestic licenses for special nuclear material and certain nuclear facilities, NRC determines that the applicant's proposed programs for material control and accounting and for physical security are adequate to meet applicable NRC requirements. Complete descriptions of these programs must be submitted for review, and a license is not issued until NRC makes findings of adequacy from the standpoints of the common defense and security and public health and safety, and protection of the environment.

In licensing exports of special nuclear material, NRC has recently developed new procedures. Under these procedures, NRC determines with respect to safeguards that the recipient country has accepted and implemented IAEA materials accounting safeguards and/or other appropriate supplementary bilateral conditions (including, where applicable, understandings regarding re-export) agreed between the prospective recipient and by the United States. In cases in which the recipient country is not required by the NPT to accept IAEA safeguards, NRC ascertains whether the recipient country or organization has accounting and inspection procedures such as to assure compliance with the relevant U.S. Agreement for Cooperation. Finally, NRC determines whether the recipient country has adequate physical security arrangements to deal with threats of subnational diversion of significant quantities of nuclear weapons material (plutonium or highly enriched uranium). These specific license determinations are supplemented by exchanges, discussions, and negotiations in the IAEA and at the government-to-government level with respect to international materials accounting and physical security standards and procedures.

In addition to the above determinations with regard to export safeguards, NRC also takes into account a number of other factors connected with its responsibilites for determining that the issuance of an export license is not inimical to the common defense and security and -- where required by law -- that the export would be under the terms of the Agreement for Cooperation pursuant to Section 123 of the Atomic Energy Act. In making these determinations, NRC is assisted by information and assessments provided by the Executive Branch agencies.

Question 2: (a) & (b) What sort of findings does NRC make in the domestic licensing process that it is precluded from making with respect to export licenses? Is NRC now authorized to make such findings with respect to exports?

Response: There are no basic findings made in the domestic licensing process which NRC would be precluded, as a matter of law, from making with respect to export licensing required by the Atomic Energy Act. As pointed out above, the specific procedures applied to safeguards determinations in export licensing differ from the procedures applied in domestic licensing.

Question 2(c): Would the public interest be better served if the same regulatory decision-making process applied to exports as now apply to domestic licensing?

Response: Although there are similarities between the export and domestic licensing processes, there are also inherent differences. For example, for a domestic license the physical protection program and the material control and accounting program are evaluated for an individual applicant. As explained in the response to Question 2, for an export license NRC evaluates the accounting, inspection, and physical security requirements of the recipient country. Thus it is not fully meaningful to make a detailed comparison between decision-making in the two areas.

Question 3: Eldon Greenberg has testified that there are no public hearings with respect to export license applications and, in some cases, not even public notice that an application is under consideration.

Why is there this apparent secrecy, as compared with the public nature of domestic nuclear licensing proceedings?

Response: A notice of receipt of an application to export a production or utilization facility is placed in the *Federal Register* with an opportunity for the public to request a hearing. A notice of the issuance of the facility export license is also placed in the *Federal Register*. No notices are issued with respect to applications for other export licenses or for domestic materials licenses except for commercial radioactive waste disposal facilities. These regulations, developed by the AEC, are being re-examined by NRC.

Question 4: Can physical security be made so tight as to make nuclear theft virtually impossible?

Response: No physical security system can be made so impregnable that it cannot be overcome, given an adversary force of sufficient size and resources. It is important to recognize, however, that the plant systems are supplemented by Federal, State and local law enforcement agencies. These provide additional capabilities for response to an attack, as well as capabilities for recovery of stolen material. In the context of the broad environment, we believe that we can draw a line describing the extent or scope of any such attack likely to be credible and that physical security systems can be designed and built to protect against such attacks.

Question 4(a): Can nuclear materials accounting be made so tight as to make diversion virtually impossible?

Response: Material control and accounting systems are directed to detection of diversion. They also act as deterrent to diversion, but they are not directed to prevention, *per se*. Like any other defensive system, they can be defeated by an adversary who has sufficient capability. However, material control and accounting systems can be designed to be effective against levels of collusion and adversary resources considered credible. Prompt accounting and internal control systems are being developed to continuously track the location and movement of all discrete items of special nuclear material on inventory and to monitor the in-process inventory for indications of diversion.

Question 4(b): Do you believe that it is possible to safely contain the enormous amounts of plutonium that will be generated each year by commercial reactors at such time as reprocessing begins?

Response: This is a matter that will be addressed by the Commission in detail in connection with the plutonium recycle question. Any response on the merits would be premature at this time.

Question 5: Last week, Dr. David Rosenbaum testified that nuclear officials in India confiscated a tape from a plutonium-measuring device used by an IAEA inspector. Were you informed of this incident?

Response: We had no information on this matter before Dr. Rosenbaum gave his testimony. Furthermore, based on the information provided to ERDA by the IAEA, the facts of the situation do not support the contention (a) that the tape was confiscated, (b) that the device in question was a plutonium measuring device, or (c) that the data on the tape was safeguards inspection data. It is my understanding that ERDA has provided you with a complete description of the incident.

Question 5(a): Assuming it is true, do you believe that India, which is not a party to the Non-Proliferation Treaty, should continue to receive nuclear exports from the United States?

Response: In considering an application for a license to export nuclear material or facilities to India or any other country, the Commission would consider whether the recipient country had accepted and implemented IAEA safeguards. In doing so, we would take into account information, including that provided by the appropriate Executive Branch agencies, on recipient country practices with respect to IAEA inspections.

Question 5(b): How do we know that India is accurately reporting the amounts of plutonium produced by its imported reactors if it won't allow IAEA inspectors to take independent measurements?

Response: To our knowledge IAEA inspectors have not been prohibited from making independent measurements in the course of their inspection activities. Assurance of accurate reporting can be had only when independent measurements are made to confirm the stated quantities.

ATTACHMENT

UPGRADING OF SAFEGUARDS SINCE NOVEMBER 1973

Upgrading of Protection at Licensed Fuel Cycle Sites:

In November, 1973, the then AEC published comprehensive amendments to its regulations to strengthen the protection of licensed fuel cycle facilities against industrial sabotage and to strengthen the protection of special nuclear material (SNM) against theft. During 1974, the protection measures called for by these requirements were implemented at 23 licensee sites.

Under the requirements, each person who is licensed to possess or who applies for a license to possess 5,000 grams or more of SNM as computed by the formula:

> grams = grams (U-235) + 2.5 (grams (Pu) + grams (U-233))
>
> where grams (U-235) means grams of U-235 contained in uranium enriched to 20% or more in the U-235 isotope

is required to comply with detailed physical protection requirements as discussed below and to prepare and submit a physical protection plan to the NRC for approval. The protection plan must contain two parts. Part 1 must address vital equipment, vital areas, and isolation zones and must demonstrate how the licensee will meet applicable requirements. Part II must list the tests, inspections, and other means for demonstrating compliance with the requirements. The licensee is not permitted to make any change which would decrease the effectiveness of his physical protection plan without prior approval of the NRC.

- The licensee must maintain a physical security organization including armed guards to protect his facility against sabotage and the SNM in his possession against theft and diversion. At least one supervisor of the security organization must be onsite at all times. The licensee must establish, maintain, and follow written security procedures which document the structure of the security organization and which detail the duties of guards, watchmen, and other individuals responsible for security. All guards and watchmen must be properly trained, equipped and qualified.

- Any equipment, system, device or material whose failure, destruction or release, directly or indirectly, endanger public health and safety must be located within a separate structure or barrier designated as a vital area. In addition, SNM must be stored and processed within a controlled area designated as a material access area. All vital areas and material access areas must be located within a larger protected area which is surrounded by a physical barrier. An isolation zone is required around the outer physical barrier, and it must be kept clear of obstructions, illuminated, and monitored to detect the presence of individuals or vehicles attempting to gain entry to the protected area so as to allow response by the licensee's security force at the time of penetration into the protected area.

- Personnel and vehicle access into a protected area, material access area or vital area must be controlled. A picture badge identification system must be used for employees. Visitors must be registered and escorted, except that an individual who requires frequent and extended access to a protected or vital area need not be escorted if he is provided with a picture badge which designates the area to which access is authorized. Individuals and packages entering the protected area are required to be searched. Admittance to a vital area and material access area must be controlled, and access must be limited to those persons who require such access to perform their duties. Methods to observe individuals within a material access area to assure that SNM is not being diverted must be provided and used on a continuing basis. All individuals, packages, or vehicles are searched for concealed SNM before exiting from a material access area. Keys, locks, combinations and related equipment are required to be controlled to minimize the possibility of compromise.

- All emergency exits in the protected area, vital areas, and material access areas must be alarmed against intrusion. Each unoccupied material access area must be locked and alarmed. All alarms must annunciate in a continuously manned central alarm station located within the protected area and in at least one other continuously manned station. All alarms must be selfchecking and tamper-indicating and tested for operability and required functional performance at specified intervals not to exceed seven days.

- Each guard or watchman on duty must be capable of maintaining continuous communications with an individual in a continuously manned central alarm station within the protected area, who is capable of calling for assistance from other guards and from local law enforcement authorities. To provide the capability of continuous communication with local law enforcement authorities, two-way radio voice communications must be established in addition to conventional telephone service. All communications equipment must remain operable by means of independent power sources in the event of loss of primary power, and must be tested for operability and performance not less frequently than once at the beginning of each security work shift.

- Licensees must establish liaison with local law enforcement authorities. In developing security plans, licensees must take into account the probable size and response time of the local law enforcement assistance. The security force must be prepared to take immediate action to neutralize threats to the facility by appropriate direct action and by calling for assistance from local law enforcement authorities.

- To aid licensees in carrying out the new protection requirements, a number of new Regulatory Guides have been issued which set forth acceptable ways for complying with selected requirements.

Upgrading of Material Control and Accounting Measures

Requirements for the control and accounting of special nuclear material at licensed plants were also revised in November, 1973, to provide greater sensitivity and timeliness for detecting the theft or diversion of material. Quality specifications were prescribed for performing plant material balances on the basis of measurements.

During 1974, the following material control and accounting requirements were generally applied to 30 facilities which were authorized to possess more than one effective kilogram* of special nuclear material in unsealed form:

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*Effective kilogram of special nuclear material means: (1) For plutonium and uranium -233 their weight in kilograms; (2) For uranium with an enrichment in the isotope U-235 of 0.01 (1%) or above, its element weight in kilograms multiplied by the square of its enrichment expressed as a decimal weight fraction; and (3) for uranium with an enrichment in the isotope U-235 below 0.01 (1%), by its element weight in kilograms multiplied by 0.001.

- The licensee must maintain and follow written material control and accounting procedures.

- Records must be kept showing the receipt, inventory (including location), disposal, acquisition, import, export, and transfer of all special nuclear material in each licensee's possession, including records of the quantities of material added to or removed from process. Physical inventory and material balance records must be maintained for a period of five years.

- All transfers of special nuclear material between material balance areas must be documented to show the identity and quantity of material. Means must be provided for the control and accounting of internal transfer documents and for obtaining authorized signatures of each document.'

- The licensee must uniquely identify items or containers containing special nuclear material in process.

- The licensee must use tamper-safe containers or vaults containing special nuclear material not in process and control access to the devices and records associated with their application. Tamper-safing may be utilized to assure the validity of material measurements performed prior to the time of physical inventory.

- Provisions must be made for accurate cutoff procedures, verification of the integrity of the tamper-safing devices used for securing previously measured material, verification by remeasurement of the quantities of material previously measured but not tamper-safed, and for the accurate listing of the inventory. In addition to the general inventory procedures, specific inventory instructions must be prepared for each inventory.

- All quantities of material on inventory must be based on measurements.

- The licensee must conduct physical inventories bimonthly for plutonium and uranium 233, and uranium enriched 20 percent or more in U-235, except for plutonium containing 80 percent or more by weight of the isotope Pu-238 and plutonium and uranium held in the inaccessible portion of an irradiated fuel reprocessing plant. The licensee must conduct physical inventories for uranium enriched less than 20 percent in the isotope U-235, and those materials exempted from the bimonthly inventories at least every six months.

- Within 30 days after the start of each physical inventory, the licensee must calculate the material unaccounted for (MUF) and its associated limit of error, reconcile and update the accounting records to the results of the physical inventory, and complete the material balance records for each material balance.

- The licensee must maintain a system of control and accounting such that the limits of error for any MUF do not exceed threshhold quantities of 200 grams for plutonium or uranium -233, 300 grams for uranium or the isotope uranium -235 contained in high enriched uranium, or 9,000 grams for uranium -235 contained in low enriched uranium, or 0.5 percent of additions to or removals from material in process, whichever is greater, except for a reprocessing plant where the uncertainty for plutonium and uranium may be 1.0 percent and 0.7 percent, respectively. In accordance with the provisions of the regulations, two plants have been allowed higher limits. Each of these has initiated programs to achieve improvements in his material control system.

In October, 1974, the AEC issued amendments to its regulations which specify fundamental nuclear material controls required to be established, maintained, and followed by licensees authorized to possess at any one time and location more than one effective kilogram of special nuclear material in unsealed form.

These amendments provide the basic criteria for detailed licensee material control and accounting systems. The criteria, in turn, provide the basis for the eventual development of material control and accounting systems utilizing advanced technology such as nondestructive analysis and automatic data processing to provide real-time accurate control of and accounting for special nuclear material.

Also in October, 1974, AEC published proposed regulations to strengthen the materials control and accounting requirements for special nuclear material in the interest of the common defense and security. Such amendments would provide greater assurance that material balances are based upon current, high quality measurement data, so that a loss of material may be distinguished from measurement uncertainty.

Under the proposed amendments each licensee who is authorized to possess, at any one time and place, a quantity of certain special nuclear material exceeding one effective kilogram in unsealed form would be required to establish and maintain a measurement control program covering all of the components of measurements used for materials control and accounting purposes. The program would include organizational controls for the management of measurement quality, training and performance qualification requirements, a standards and calibration system, a quality testing system for the determination and the control of systematic and random errors, a records evaluation system for the collection and statistical analysis of the data, and a system of management audits and reviews. If adopted by the Commission the proposed amendments would give licensees three months to submit plans for the measurement control programs. The licensees would be required to follow the plans submitted six months after the deadline date for submission or thirty days after Commission approval whichever is later.

To aid licensees in carrying out the new material control and accounting requirements, a number of new Regulatory Guides were issued in 1974 to set forth acceptable ways for complying with selected requirements.

Upgrading of Protection of SNM During Transport:

Comprehensive amendments to Commission regulations were issued in November, 1973, to strengthen the protection of SNM during the course of transportation. Each person who is licensed or who applies for a license to possess more than 5000 grams of special nuclear material as computed by the formula given above, except SNM contained in irradiated fuel, must submit a plan to the NRC for review and approval outlining the methods to be used for the protection of the SNM while in transit. The licensee is not permitted to make any change which would decrease the effectiveness of his transportation security plan without prior approval of the NRC. The plan must demonstrate the means to be used in meeting the following requirements:

- If a common or contract carrier is used, the SNM must be transported under the established procedures of the carrier which provide a system for the physical protection of valuable material in transit and require a hand-to-hand receipt at origin and destination and at all points enroute where there is a transfer of custody. Transit times of all shipments must be minimized, and routes must be selected to avoid areas of natural disaster or civil disorders. SNM must be shipped in containers which are sealed by tamper-indicating type seals. The outer container or vehicle is required to be locked and sealed. No container weighing 500 pounds or less may be shipped on open vehicles, such as open trucks or railway flatcars.

In November, 1974, the AEC published new proposed regulations to further strengthen the protection of nuclear material in transit. The regulations proposed, among other things, a significant strengthening of the armed escort which accompanies the shipments.

Upgrading of Protection at Licensed Nuclear Power Plants:

Regulations issued in November 1973, 10 CFR Parts 50 and 73, required that upgraded security plans for all licensed nuclear power plants in the United States be submitted to the Commission. All such resubmitted security plans have been reviewed by the staff, revised if necessary, and subsequently found acceptable. In November 1974, the Commission published for comment proposed new rules, as 10 CFR Section 73.55, setting forth specific requirements for physical protection of nuclear power plants against acts of industrial sabotage. Comments received are presently being considered and a modified rule is expected to be issued within a few months. Following issuance of the effective rule, its requirements will be implemented.

The Sandia Laboratories currently have underway contract studies on the vulnerability of nuclear power plants to acts of sabotage. The first phase of this multi-phase study was completed in 1974 and their final report is expected to be issued in the near future.

Senator GLENN. Our next witnesses this morning are Dr. Dixy Lee Ray, Assistant Secretary of State for Oceans, International Environmental and Scientific Affairs, and former Chairman of the Atomic Energy Commission; Dr. Robert C. Seamans, Jr., Administrator, Energy Research and Development Administration; and Mr. John K. Tabor, Deputy Secretary of Commerce.

I am glad to welcome such a distinguished panel here this morning, and I look forward to your testimony.

Dr. Seamans, perhaps you could lead off. We have your statement.

Do you propose to read it this morning, or would you like to submit it for the record?

Dr. SEAMANS. I would like to submit it for the record, Mr. Chairman.

Senator GLENN. Fine. Are there statements from the other panel members?

Do you have those to be submitted?

Dr. RAY. I would like to present my statement, Mr. Chairman.

Senator GLENN. You may proceed, Dr. Ray.

TESTIMONY OF DR. DIXY LEE RAY, ASSISTANT SECRETARY OF STATE FOR OCEANS, INTERNATIONAL ENVIRONMENTAL AND SCIENTIFIC AFFAIRS, AND FORMER CHAIRMAN OF THE ATOMIC ENERGY COMMISSION

Dr. RAY. Thank you Mr. Chairman.

I am pleased to have this opportunity to appear before you since the subject of the bill S. 1439 is one in which I have a great personal interest both in my previous position as Chairman of the Atomic Energy Commission and my current role as the Assistant Secretary of State who is responsible for international nuclear activities. I am accompanied by Mr. George Vest, Director of the Department's Bureau of Politico-Military Affairs, who has important responsibilities in the field of export control, and members of my staff.

Before I turn to some of the significant aspects of this legislation, I would like to offer some general observations.

First: As is true for the members of this committee, the Department of State ascribes high importance to assuring that U.S. international cooperation in the nuclear field is conducted under conditions that are compatible with our nonproliferation objectives.

Second: In approaching this problem I believe we must give recognition to the extensive efforts that have gone into the development of international machinery to help assure that nuclear energy is used only for peaceful purposes. The broad bilateral safeguards rights which we have acquired, the IAEA safeguards systems, and the Non-Proliferation Treaty represent unprecedented measures in the long history of man's efforts to evolve institutions which reduce the risks of international conflict—measures which I believe deserve continuing support.

Third: We must recognize that we are no longer living in a world where the United States has a monopoly. The technology for the production of fissionable materials has been in practical use in the United States for more than 30 years. Few, if any, technologies have diffused so little over such a long period of time. Other nations, however, are now actively constructing their own nuclear facilities and providing significant nuclear assistance to others. This fact limits our bargaining power in securing the arrangements which, ideally, might desirable, and make it all the more important that we cooperate with other countries bilaterally and multilaterally to achieve our nonproliferation objectives.

With the foregoing factors in mind, I strongly urge that we continue to give our full support to the NPT and the IAEA safeguards system and urge widespread acceptance of these instruments, by as many states as possible. The IAEA safeguards system, despite its imperfection, represents one of the best techniques that we have to verify independently that nations are directing their safeguarded activities to peaceful purposes. It also has represented an unprecedented step on the part of many nations to submit to international inspections to verify that their treaty commitments are being adhered to. Any step which might, however unintentionally undermine our efforts in support of the IAEA system might well set back rather than advance our nonproliferation objectives. Thus, I believe that the remedy to correct any deficiencies in the present system can be found in our seeking to strengthen this system, rather than in our seeking to create new devices.

In view of the realities that we now face, it is more important than ever for us to work vigorously in concert with other nuclear equipment suppliers to assure that we are all following common and prudent export control policies. This is an area to which the United States has devoted very substantial attention over recent months.

It also is important, to my mind, for the United States to continue to associate itself constructively with foreign nuclear power programs in ways that will help assure that these programs are oriented to peaceful purposes. In this latter regard, I should stress that I am not one of those who now criticize the "Atoms for Peace" program or who assert that this program was a major cause for our current challenge. As others have indicated, I am convinced that had the United States not agreed to cooperate in the 1950's, other nations would nevertheless have proceeded on their own, or with the help of other suppliers. The risks of allowing independent nuclear programs to emerge without restraint or control would have been greater than those that have been associated with the course we since have followed.

Finally, and before turning to the specifics of the legislation, I would hope that we could agree that nuclear power promises to pay an extremely vital role in helping to meet our energy needs and that this role has even greater importance as we and others endeavor to reduce our dependency on foreign energy suppliers. Consequently, in approaching the challenge of fostering effective export controls, I would hope that we would neither hobble the further development of a vital new energy source nor our ability to closely cooperate with our allies in putting this energy source to constructive use.

We should now like to comment on some of the principal features of the bill.

The Department of State is unable to concur with sections of the bill which would transfer to the Secretary of Commerce such functions of the Secretary of State under section 414 of the Mutual Security Act of 1954 as relate to the approval for export of arms, ammunition and the implements of war. Our basic objection relates to the fact that foreign policy considerations are the fundamental objectives behind this provision of the law. Consequently, we believe it is important for administration of this provision to remain with the Department of State. Mr. Vest, who is with me will be happy to explain some of our concerns in this regard, in further detail.

Reverting to the more central nuclear focus of the bill, we foresee several difficulties.

Section 7, for example, would preclude the Secretary of Commerce from licensing or approving nuclear exports unless the Nuclear Regulatory Commission first determine that the recipient countries have safeguards at least substantially comparable to safeguards required by NRC in the United States. This would accord NRC, a de facto right to veto exports. In addition, in the case of "strategically significant" exports which are not defined, section 8 would require NRC to prepare a "nuclear proliferation statement" and to furnish this statement to ACDA for comment prior to proceeding with an export.

We have substantial reservations about the propriety of using "comparability with the U.S. domestic safeguards systems" as the basic test for determining whether any exports should be approved. This, to our mind, may give emphasis to the U.S. domestic safeguards system and insufficient weight to other factors that could be more relevant to determining whether an export would be inimical to the common defense and security. For example, we believe that adherance to the NPT and subjecting the facilities involved to IAEA safeguards are more important than conformance with our domestic safeguards in helping to assure that the cooperating government will be a stable and reliable partner in a transaction.

National systems, including the U.S. domestic system are principally designed to deal with internal threats. The IAEA system, however, is our basic and most important tool to detect and prevent diversions to military programs at the national level and it is far more rigorous from this standpoint than most domestic systems. While the two kinds of systems are complementary, we are concerned that the bill would serve to shift emphasis away from U.S. support of IAEA controls.

Also while we favor and are encouraging a general upgrading of domestic safeguards systems worldwide, we question the propriety of the United States employing its own system as the test against which to measure the performance of other countries. Of necessity, there can be legitimate differences between national programs because of wide, difference in constitutional and legal practices, customs, et cetera. Moreover, as it is the U.S. domestic system gives fairly broad delegations for implementing and policing responsibility to U.S. industry. While this appears appropriate in our free-enterprise society, different systems or arrangements could well be required in other governmental systems.

We also are concerned that cooperating countries would view the flat requirement that U.S. physical security standards be employed as a test for cooperation, to be an unwarranted intrusion into their domestic procedures.

It should be noted, that at the present time, exports can be denied if the executive branch judges them to be inimical to the common defense and security, et cetera. This is a broad and useful test that has enabled the United States to take various factors into account, including a country's stability, NPT status, safeguards attitudes, et cetera, prior to authorizing significant exports. While we recognize that the other applicable provisions of the Atomic Energy Act will remain unchanged we are concerned that the new bill could reduce flexibility in processing exports by implying that "comparability with U.S. safeguards" and preparation of a "nuclear proliferation assessment statement" are the only criteria.

We also have some reservations about the suitability of having NRC prepare the nuclear proliferation assessment called for by section 8. As others have explained the evaluation of how a sensitive export might affect a country's nuclear program frequently involves the participation of several national security agencies within the executive branch. We believe this picture should be allowed to continue.

This, in turn, brings up a far more basic problem relating to the appropriate role that NRC should assume in the international safeguards and nonproliferation area.

Frankly we have reservations about the propriety and constitutionality of enabling NRC to prevent, through its actions, the implementation of agreements for cooperation that have been negotiated by the executive branch, approved by the President and reviewed by the Congress prior to entry into force. This is a very serious problem that I believe merits further attention. NRC, however, does have very important responsibilities in the domestic safeguards field, and we believe its technical counsel should prove useful when it comes to supporting the executive branch in its efforts to deal with subnational or terrorist threats at an international level.

On balance, Mr. Chairman, we are concerned that this legislation might detract from the mechanisms established under the NPT and IAEA systems and possibly hinder rather than promote our nonproliferation objectives. We also are concerned, that the procedural complexities that might be inherent in the bill could lessen the credibility of the United States as a supplier of nuclear fuel and equipment with possible adverse political and economic effects.

These are our preliminary views but we, of course, will be pleased to discuss the matter with you further.

This concludes my formal statement and I remain available to try to answer any questions that you might care to put to me.

Senator Glenn. Thank you, Dr. Ray.

[Additional questions submitted by Senator Ribicoff to Dr. Dixy Lee Ray, with responses follow:]

RESPONSES

Question #1:

Is it true that the United States does not have access to the specific terms of the subsidiary safeguards agreements that the IAEA negotiates in our behalf with nations to which we export nuclear materials and facilities? If so, how can we be sure that these safeguards are adequate?

Response:

Safeguards agreements negotiated by the IAEA with Parties to the Non-Proliferation Treaty consist, in general, of two parts. These are: (a) the safeguard agreement itself, which establishes the general rights and obligations of the Agency and the country to be safeguarded, and (b) the subsidiary arrangements, which describe in greater detail the normal procedures of implementation in relation to specific facilities. These subsidiary arrangements do not abridge the Agency's rights which are set forth in the basic agreement. Since the degree of detail with respect to the country's nuclear program included in subsidiary arrangements normally reveals proprietary information, these arrangements are not made available to the Member States or their representatives. Nevertheless, there are means by which the United States can and does assure itself of the adequacy of the Agency's safeguards, both in terms of the arrangements concluded and their practical application. Most importantly, the U.S. is a member of the Agency's Board of Governors, which is fully responsible for the effective functioning of the Agency's safeguards system. In meeting this responsibility, the Board is entitled to and receives information of the Agency's safeguard system and activities, including the number and type of installations and the kind and quantity of materials subject to safeguards, the number of inspections conducted, the composition of the Agency's safeguard staff, the inspection methods employed in the system, and the results of such inspections in the case of suspected non-compliance.

Another important factor in assuring the adequacy of the Agency system is the active participation of well-qualified U.S. citizens, as Agency staff personnel, in every phase of the development and application of the system. These U.S. citizens are, of course, international civil servants during the course of their IAEA assignments, and neither seek nor receive U.S. government guidance, but are exceptionally well-qualified to provide background and expertise on U.S. safeguards policies to the IAEA. The U.S. Mission to the IAEA, in the regular course of its liaison responsibilities with the Agency holds frequent discussions with Agency safeguards personnel of both U.S. and other nationalities to review the operation of the Agency system.

Question #1.(a):

Is it true that we do not have access to the IAEA's safeguards reports on these exported materials and facilities? If so, how do we know that these materials and facilities are being safeguarded to our satisfaction?

Response:

It is correct that, for the same reason that subsidiary arrangements are not disclosed, inspection reports are not available to Member States. However, the Director General and staff of the Agency are required to refer promptly to the Board of Governors any non-compliance with safeguards. In addition, as previously indicated, there are several mechanisms through which the U.S. and other Member States monitor the effectiveness of application of safeguards by the Agency.

Question #1.(b):

How can we control our nuclear exports effectively without direct access to this information?

Response:

In view of the consideration described above, we do not believe that direct access to Agency safeguard reports is necessary for effective control of U.S. exports. The information available to the United States is adequate to provide us with knowledge of the effectiveness of Agency safeguards and to inform us of any non-compliance on the part of recipient countries. Provision by the IAEA to other nations of information on its safeguards findings would undermine the concept of international inspection and make the system, and the Non-Proliferation Treaty which it supports, less acceptable to other countries.

Question #2:

How can we distinguish between a country that seeks to develop its own nuclear fuel facilities as a means of ensuring its energy independence, and a country that wants its own nuclear fuel facilities for developing nuclear weapons?

Response:

There are similarities in designs and, in some cases, an overlap or duality in functions between fuel facilities built to serve a legitimate civil nuclear power purpose, and those built to serve a nuclear weapons or nuclear explosive device program, which often make it difficult to distinguish the overall characteristics of the country's nuclear program. Nevertheless, the specific nature of the fuel cycle facilities which it constructs can provide an important and meaningful indication of the intended purpose of the facilities and of the country's overall nuclear program. This is particularly true in the case of relatively small and unindustrialized countries whose ability to undertake a nuclear power program could be expected to depend largely on technology or equipment procured abroad, rather than on indigenous development effort.

In the case of such a country undertaking a legitimate nuclear power program, for example, it would be expected that the reactors installed in the country would be clearly designed for the purpose of power production, and that no large, low burn-up, low-temperature reactors (whether fueled by natural or slightly enriched uranium), would be present. One or more research reactors could serve legitimate and, indeed, essential purposes in connection with an overall peaceful nuclear program, including training of nuclear engineers and scientists essential to the safe conduct of a nuclear power program, radioisotope production, and the like. Either natural uranium or enriched uranium fueled research reactors can be effective research and training facilities, but natural uranium reactors produce plutonium as a by-product, while research reactors fueled with highly enriched uranium ordinarily cannot do so. Distinctions in specific fuel cycle facilities which might exist if intended for peaceful or for non-peaceful purposes are discussed in the response to Question 2(a).

Another factor which may be relevant is whether the country, if it is not a party to the Non-Proliferation Treaty, has acquired and continues to acquire its nuclear facilities from other suppliers, thus bringing these facilities under peaceful use guarantees and safeguards, or whether, in contrast, it seeks to develop and build some or all these facilities indigenously, thus avoiding any commitment to peaceful uses and safeguards.

In addition to any evidence which might be adduced from the nature of a country's nuclear program and facilities, there may be a number of other indications of whether a country seeks fuel cycle facilities exclusively for peaceful purposes or in order to preserve an option for the production of weapons material. These include the country's stated policy with respect to nuclear weapons and nuclear proliferation, its general political and defense posture, its readiness to accept safeguards, and, of particular importance, whether the country is a party to the Non-Proliferation Treaty, and to any other treaties, such as nuclear free zone conventions, through which it has undertaken not to acquire nuclear weapons or explosive devices.

While nuclear power reactors and associated fuel cycle facilities have the capability of producing plutonium for use in nuclear weapons programs, there is no evidence to date that a nuclear weapon or nuclear explosive device program has been based upon or involved the use of facilities constructed primarily for such purposes, or that facilities or materials subject to safeguards have been diverted to these uses. The Indian explosive device, it should be stressed, used unsafeguarded material produced in an unsafeguarded research reactor.

For many, if not for all countries, who might intend to develop a nuclear weapons capability, or to retain the option to do so, the establishment of indigenous facilities outside of safeguards and not involved in the nuclear power cycle, may represent the most attractive course of action to pursue that objective, as it clearly has in the past. Thus, U.S. policies should minimize the incentives and eliminate insofar as possible the opportunities and the rationale which other countries may assert for following this approach.

Question #2.(a):

Is there any way to make that distinction by evaluating the design of the fuel facilities?

Response:

Since light water nuclear power reactors utilize substantially different types of nuclear fuel and employ much different operating conditions than do reactors which can produce plutonium without the production of useful power, the fuel cycle facilities associated with these different types of reactors may differ substantially. In particular, a fuel reprocessing facility which is designed for the reprocessing of fuel from low temperature, low burn-up fuels such as are employed in plutonium production reactors or in research reactors will be unable to reprocess power reactor fuel elements, which are clad with much less easily processed materials and have very much higher fission product levels. The experience of the U.S. and other nuclearly advanced countries demonstrates clearly that while the reprocessing of low burn-up, low temperature fuels involves technology which is relatively unsophisticated and widely available, the reprocessing of power reactor fuel elements, especially on an economic scale, is a technically difficult task. The unavailability of facilities for reprocessing of power reactor fuel elements could stimulate a country to develop independent small scale facilities for reprocessing on a developmental basis.

Question #2.(b):

Should we oppose the development of nuclear fuel facilities by non-nuclear weapons states generally?

Response:

The United States does not favor the widespread establishment, in non-nuclear weapons states, of fuel-cycle facilities which have the capability of contributing to a nuclear weapons program. This policy, however, is not necessarily promoted or effectively served by opposition to the installation of such facilities in every case, since a policy of total opposition could well lead to the establishment of facilities under no control whatsoever, or under less effective control.

In line with its policy of not favoring the widespread establishment of nationally-controlled sensitive fuel cycle facilities, the U.S. has instituted specific controls and taken specific international initiatives. Sensitive aspects of U.S. uranium enrichment technology remain classified, and, as a result of U.S. initiative, international understandings were reached in the early 1960's to classify centrifuge uranium enrichment technology on the part of the countries principally engaged in its development. The U.S. strictly controls the export of uranium enrichment, reprocessing, and heavy water production technology, and is not transferring sensitive technology in these areas.

At the same time, since the U.S. is not the only source of supply of technology or equipment in any of these areas, specific instances of possible installation of fuel cycle facilities in non-nuclear weapon states must be reviewed on their merits in relation to U.S. non-proliferation objectives. We believe these objectives are best served by maintaining U.S. influence in the nuclear programs of other countries in an effort to ensure insofar as possible that these are directed exclusively toward peaceful purposes under effective international safeguards.

An important factor bearing on U.S. policy in this area is the undertaking of Article IV of the Non- Proliferation Treaty, which states the following:

> "All the Parties to the Treaty undertake to facilitate, and have the right to participate in, the fullest possible exchange of equipment, materials and scientific and technological information for the peaceful uses of nuclear energy. Parties to the Treaty in a position to do so shall also cooperate in contributing alone or together with other States or international organizations to

> the further development of the applications of nuclear energy for peaceful purposes, especially in the territories of non-nuclear-weapon States Party to the Treaty, with due consideration for the needs of the developing areas of the world."

The Non-Proliferation Treaty, like any other important agreement, involves a bargain between the Parties. As this provision reflects, an important part of the consideration for which non-nuclear weapons States which are Parties to the Treaty agreed to relinquish their right to acquire nuclear weapons or nuclear explosive devices is the understanding not only that they have the right to participate in the peaceful uses of nuclear energy, but shall receive the cooperation of the nuclearly advanced States in doing so. To the extent that the United States appears to be drawing back from this undertaking the attractiveness of the NPT will be diminished, as will U.S. ability to influence affirmatively the improvement and strengthening of the Agency safeguards system.

Question #3:

With the U.S. holding such a commanding role over uranium enrichment services for non-Communist countries well into the 1980's, what alternatives would importing nations have to accepting tougher safeguards, if we choose to impose them?

Response:

While the United States had enjoyed a dominant role in the supply of uranium enrichment services and is the principal distributor at present, it no longer has a "commanding role." On the contrary, existing U.S. enrichment capacity is now fully committed, and pending firm commitments to the installation of new capacity, the U.S. is legally unable to make further commitments for the supply of enriched uranium. This fact, coupled with the fact that other nations are now active in contracting for the supply of uranium enrichment services places evident limitations on the U.S. ability to insist on specific supply conditions.

The availability of natural uranium reactors is another factor which must be considered in realistically assessing the U.S. bargaining power as a supplier of enriched uranium. It is frequently overlooked that the first two reactors sold in international commerce -- to Italy and Japan -- were natural uranium reactors of the magnox type. These reactors continue in regular and reliable operation. Since that time, natural uranium power reactors have been purchased by Argentina, India, Spain, Pakistan, and Korea, and additional countries are considering their purchase.

The selection of natural uranium reactors by these countries, despite their less favorable economic characteristics, is a direct reflection of the reluctance of many nations to depend on enriched uranium, and clearly illustrates the limitations on U.S. ability, through its dominant position as an enriched uranium supplier, to impose excessively strict conditions on its use.

The decision by other countries to devote significant resources and to assign substantial portions of their electrical generating capacity to the use of nuclear reactors which depend for their vital fuel needs on a single outside source of supply is an extremely difficult one. The fact that a number of countries made this decision during the years when the United States enjoyed a nearly exclusive role in the supply of enriched uranium reflects both the technical and economic superiority of U.S. reactor technology and the adoption of governmental fuel supply policies which were designed to reassure the recipient country of long-term availabiltiy of U.S. enriched uranium on stable and attractive terms, and without undue restrictions as to related fuel activities by the recipient. Without such policies, the technological superiority of U.S. reactors alone would not have led to the widespread adoption of light water reactors. We believe that their adoption has served U.S. interests well by developing and maintaining a strong basis for the U.S. to influence the nuclear power programs in the direction of peaceful uses. Largely as a result of this influence, the U.S. was able to secure and implement safeguard and inspection rights of an unprecedented nature, and was able to propose and bring about the adoption of the Non-Proliferation Treaty which similarly includes unprecedented provisions for international verification.

To secure and preserve these advantages, the U.S. adopted and followed throughout the period of U.S. dominance as an enriched uranium supplier, policies which were designed both to encourage the use of enriched uranium reactors and to minimize insofar as possible and for as long as possible the development of sources of supply. These policies were evolved during the course of intensive negotiations covering many years, and represented the best judgement of the Department of State and the Atomic Energy Commission, working in close consultation with the Joint Committee on Atomic Energy, as to what was achievable. The best evidence that policies significantly more rigerous than these would have been unacceptable and counter-productive is the emergence of independent sources of enriched uranium elsewhere in the world. The development of these sources was, in part, a result of the desire of other countries to avoid what they regard as excessive reliance on the United States, and was not fundamentally a result of concern over the adequacy of U.S. supply capabilities, which emerged at a later date. At the same time, changes in U.S. fuel supply policy price and contracting criteria during the past five years, and the recent uncertainty over when new enriching capacity will be constructed in the United States has further increased foreign concerns over the reliability of the U.S. as a fuel supplier, and further stimulated the development of alternative sources of supply.

While the U.S. remains for the time being the principal supplier as a consequence of arrangements entered into earlier, our policies on safeguards must continue to take into account both the need for good faith implementation of these earlier commitments and the realities of the present supply situation. We are working closely with both other suppliers and recipient countries on a continuing basis to strengthen international safeguards and physical security arrangements, and we believe substantial progress is being made in these efforts. Attempts to impose arrangements which are not perceived by other countries to be in their own interests would be unrealistic in the light of the current supply situation and would accelerate and strengthen the development of sources of supply independent of the United States.

Question #3.(a):

For example, could they turn to the Soviet Union for enrichment services? Are the Russians willing and able to provide an alternative supply of highly enriched as well as low-enriched uranium?

Response:

At the present time, enrichment services on a commercial scale are being offered by the Urenco Centrifuge enrichment consortium, consisting of the United Kingdom, the Federal Republic of Germany and the Netherlands; by Eurodif, the French-Italian diffusion enrichment enterprise (whose first plant is to be in operation by 1980), and by the Soviet Union. The United Kingdom is also continuing to operate its own diffusion plant to meet internal needs. Additional capacity is being considered by the former two organizations, while several other overseas enrichment undertakings are being actively considered. South Africa is operating a small pilot plant and has recently announced plans for the construction of a commercial scale plant.

The Soviet Union has a large capability for the supply of enrichment services, and has concluded complete supply arrangements with Great Britain, France, Italy, the Federal Republic of Germany, Belgium, Sweden, Finland, Spain and Austria. It is also actively promoting the sale of enrichment services to other nations, especially Japan.

Data provided by the Federal Republic of Germany indicate that in 1975, 35% of enriched uranium deliveries to the FRG will be provided by the Soviet Union, and that in 1977 this proportion will become 49%. By 1979, another 20% of West Germany's requirements will be derived from Western Eurpoean sources, with their share increasing to 30% by 1982. These data for the nuclear power program of the Federal Republic of Germany, the largest in Europe, are indicative of the extent to which the U.S. domination of enriched uranium supply is being reduced by the emergence of independent sources of supply.

We have no definite knowledge of whether the requirements for highly enriched uranium in Western Europe and elsewhere would be met by the Soviet Union, since we are aware of no requests to the Soviet Union for such material. At the present time, highly enriched uranium is not being produced by the Urenco centrifuge facilities, although they are capable of doing so. It is our understanding that plans for Eurodif do not include a capability for the production of highly enriched uranium, although the French national plant produces such material at present for the French military program. The United Kingdom plant formerly produced highly enriched uranium, but its upper stages are not operating at the present time.

Although the requirements for highly enriched uranium in Western Europe and elsewhere are relatively limited, consisting largely of fuel for research, test, and experimental reactors, the investment in these facilities which would be idled if highly enriched uranium were not available is substantial. We have no doubt, therefore, that alternative arrangements for the supply of such material would be made if it should cease to be available from the United States. For example, this could involve operation of Urenco's centrifuge facility to produce highly enriched material, although other solutions are conceivable. Regardless of what solution might be employed, we believe that the development of alternate supply sources for highly enriched uranium would be decidedly prejudicial to U.S. interests and to our overall non-proliferation objectives.

Question #4:

How do your functions differ from those in ERDA with respect to promoting United States nuclear technology abroad?

Response:

The Department of State is responsible for ensuring that U.S. nuclear cooperation policies and programs are consistent with U.S. foreign policy interests, of which the U.S. policy of avoiding the proliferation of nuclear weapons is a major facet. Among other matters, the Department of State is responsible for U.S. participation in and representation at the International Atomic Energy Agency, which deals with a wide variety of activities in the field of peaceful uses of nuclear energy.

The promotion of U.S. technology abroad is not an objective in itself, but is undertaken only to the extent that it serves overall United States interests. Toward this end, the Department of State works closely with ERDA and the Nuclear Regulatory Commission to ensure that foreign policy and national security interests are taken into account in such activities as the negotiation of agreements for cooperation (which the Department of State undertakes jointly with ERDA) and in the implementation of these agreements, including the issuance of nuclear export licenses.

The Department of State also undertakes direct action, with other nations and international organizations, often jointly with ERDA, in a variety of areas involving international nuclear cooperation, including cooperation and consultation between nuclear suppliers on non-proliferation matters, the development of adequate safeguards and physical security arrangements, and assuring the adequate supply of nuclear materials for peaceful purposes.

While the relationship between the Department of State and ERDA involves extremely close cooperation, with many activities being undertaken jointly, in general it can be said that ERDA has primary responsibility for the implementation of Agreements for Cooperation through the negotiation and administration of fuel supply contracts and information exchange arrangements, as well as the provision of technical advice and information to various countries and international organizations with which the U.S. cooperates in the peaceful uses of nuclear energy. The Department of State, working with the National Security Council as appropriate, is responsible for foreign policy guidance. In carrying out its responsibilities in the nuclear area, the Department coordinates the views of the Executive Branch Departments and Agencies concerned in order to arrive at appropriate judgments on specific export license applications.

Senator **Glenn**. I know Dr. Seamans has to leave by 12.

Dr. **Seamans**. If possible.

Senator **Glenn**. So perhaps we could wait for your statement just a moment, Mr. Tabor, and then we could get our questioning here so Dr. Seamans would be free to leave.

Do you have any time constraint?

Mr. **Tabor**. I do, Mr. Chairman, but let's proceed as you wish. That is fine.

We are trying to get a statement to the White House at 3 o'clock and we are pressed but let's proceed and I think Dr. Seamans can go ahead first.

Senator **Glenn**. Fine.

Dr. Seamans, with respect to the old AEC, and the new NRC, did they not have the authority under section 103 of the Atomic Energy Act, to disapprove an export license favored by the President? I do not see how our bill would change that except to transfer from ERDA to NRC the safeguard resources needed by NRC to make independent judgments. Would you comment on that?

TESTIMONY OF DR. ROBERT C. SEAMANS, JR., ADMINISTRATOR, ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION

Dr. **Seamans**. It appears to me that in the previous arrangement you had the total capability for a review of an individual application for the licensing, as well as for the final presidential determination, all in one branch of the Government and it seems to me the situation is really quite different when one of the elements is separated from the executive branch and is a third party, third party to both the executive branch and the Congress. It seems to be quite a different situation from an organizational standpoint.

Senator **Glenn**. I would agree completely, from an organizational standpoint.

I think that was intended in last year's change of organization, in that the safety monitoring, the safety and safeguards aspects of commercial nuclear energy were very deliberately set apart and given to the NRC, so that it would be more independent. In the questioning I had with Chairman Anders here earlier, he reflected the concern of the whole committee, that perhaps they are given a job now, and do not have the means to do it, because they are still dependent on the executive branch through your agency to perform these technical functions for them.

Is that a fair criticism or do you think that is not true?

Dr. **Seamans**. First, let me say I am entirely in sympathy with the existing law and, as I said in my statement, from the standpoint of domestic licensing, I think this is a good move, and I think that we are proceeding in a very acceptable manner, in a manner that will mean an improvement over past practices.

What I was referring to was that part of the licensing that involves foreign sales, foreign distribution, and agreements with foreign countries; and it seems to me that there is a very major organizational problem that we now face.

However, I think we can work this out under the existing law. It is our intention to provide whatever information the regulatory commission requests of us. As to the issue of whether they have sufficient capability or not, I would submit that they must have sufficient capability, that they can ask the right questions, thus they can judge whether the information that they are receiving is indeed sound, and they can, if they wish, run some independent audits, but I think it would be a great mistake if the NRC were put in a position where they have to duplicate everything that is already being done and for which we in ERDA have a very great capability.

Senator GLENN. Well, AEC, of course, was an independent agency and the actual research and development aspects of nuclear energy have now been placed, very deliberately placed under the executive branch, so they would be more manageable, as far as part of the overall energy picture goes for the Nation. So, in effect, NRC has, in inheriting the safety aspects that had sort of lost their independence—independence in terms of technical capability, within the AEC. We wanted to make NRC the real independent agency they should be. Let me get on to a little different field here.

You had made a comment in your statement that comparability of safeguards would be an unworkable standard for international safeguards.

I think with us looking at this as a world wide problem and with everyone concerned about it, is this, are we not sort of living in really one world, as far as nuclear energy goes and if we are to apply different standards internationally than we apply domestically, would this not be our weakest link in the international chain, if we had less than safeguard requirements for overseas sales than we have to our own people.

Dr. SEAMANS. I think the matter of comparability was discussed very well by Dr. Ray in her statement. We should not expect every other nation in the world to do things in exactly the same way as we do.

I think we obviously have to be sure we have adequate safeguards, but to feel that everything should be done in a similar fashion as the United States, I believe, is wrong.

Senator GLENN. Well, I would tend to think if we look at this as a worldwide problem, it is difficult for me personally to see how we can really go with different criteria, when any uncontrolled nuclear activity affects really the whole world.

It is not a question of can we afford to. As I look at it, it is a question of can we afford not to apply the same strict standards throughout the world. I appreciate your comment in your statement to the effect that we have—by participating in the nuclear spread around the world—been able to control it to a degree. I think that is an important factor and you made a very good point of that in your statement.

We want to keep involved in this whole process, though. We supply 90 percent of the world's enriched uranium. It is a very high percentage of the world's enriched uranium supply.

Dr. RAY. With respect to the world's natural uranium resources, we have probably less than one third known in uranium or domestically.

Other parts of the world, Australia, South Africa, Canada, make up the rest of the raw material of the resources that is presently known, that is uranium ore.

When it comes to enriching that uranium for the light water reactors, which is a predominant but not the only type used around the world, we at the present time are the major supplier in the Western World.

Every indication is in the foreseeable future, we will be in a very highly competitive position, because there are several suppliers that are now in the process of building the plants.

Senator GLENN. Well, let me ask another question to get on a little different line here.

I think Mr. Ander's testimony was to the effect that and his statement backs up this, that they feel they actually have the regulatory power now to license or not to license and in your statement, I believe you commented that this would accord NRC a de facto right to veto exports, as though this was some right to be given under this new bill.

Are we at a variation as to what agency of Government as this authority?

I think it was obvious from Mr. Ander's statement he feels he has that authority now, and this legislation we are proposing would not give him any more authority than he feels he already has in place right now under the Atomic Energy Act. Now, do you dispute that?

Dr. SEAMANS. No, sir, the actual issuance of the licenses, as I think Chairman Anders made quite clear, is simply the last act of a long series of activities that begun with the negotiation of an agreement for cooperation.

Exports from the United States of nuclear materials are carried out under an agreement for cooperation, and the exports are subject to the conditions worked out in that agreement for cooperation. We are talking about what is in effect the last act after something has been negotiated by the executive branch of the Government which has been coordinated among the departments of the executive branch, developed by ERDA, approved by the State Department, approved by the President, and approved by the Congress. The actual formal issuance of that license by itself is not a determination, a determining act, if you will.

Senator GLENN. Thank you.

Senator PERCY. Dr. Seamans, out of consideration for your departure we will concentrate, if it is all right with the other panelists, on your testimony first. I do have a number of questions, and I will be prepared in a few minutes to begin.

Dr. Seamans, on page 3 of your testimony, you assert the United States is constantly trying to improve the IAEA's effectiveness through their financial and technologic-politic support.

On page 4, you assert the United States has been in the forefront of working next, through the IAEA. However, we have to take into account the testimony we had earlier in these hearings. In my opening statement, I stressed that we were trying to place our emphasis, not on the changes that have been made and the wild hypotheses that have been thrown out but on the most constructive possible approach we can take. Yet when we take into account, doctor, the testimony—Ikle's testimony, which I followed up in a private meeting with him because I was so concerned with some of the things he said—it is very clear indeed, that these distinguished witnesses put forth the real possibility for potential theft of nuclear materials by terrorists. Do you then agree that it is not inconceivable that a well-organized terrorist group could fashion a bomb?

Dr. SEAMANS. Well, it is a question that, of course, has come up in the past, and there have been programs on the TV that have gotten into this issue and it is certainly possible that persons, terrorist groups could conceivably design a device and that they could gather the material but there is still a long way to go before the actual processing takes place and an effective bomb could be put together.

They are talking about a job that requires a tremendous amount of skill and detailed knowledge for the processing; it is not just a question of knowing what the ultimate design should be.

However, I guess one already has to say that, that you cannot rule out the possibility.

Senator PERCY. Taking into account that it could be highly possible that without any kind of public disclosure, countries in the Mideast or a country could possibly have a nuclear capability and taking into account the shock to the world, when it was revealed that India already demonstrated its capability for processing nuclear fuel, when you say it would take some time, how long do you feel for a well-organized, heavily financed terrorist group that could draw resources from all over the world for its activities?

How long would it take for such a group, when you say it would take some time?

Is it a matter of years or could it be done within a year?

Dr. SEAMANS. I guess my response to that would first be that, as you are well aware, I have not been on this job more than a few months.

I have not myself had a chance to visit all of our installations that are involved in the various processes, the industrial processes, but I would point out in the case of India, that they have been involved in nuclear activities for a long time.

I paid them a visit myself in 1965. I went through their various laboratories at that time, and I know that they have built up a very strong set of institutions for doing their kind of work, and I very much doubt myself that a terrorist group hidden somewhere could do this in a short period of time.

You ask how long am I talking about, I really do not know the answer to that question, but I must point out the Indian Government was working for many years before they developed that capability.

Senator PERCY. Well, of course, we have no idea of how long terrorist groups may have been working on this project, because after all, there are terrorist groups in the Middle East that have been there for several decades and that have had available to them certain resources.

Now, we purposely did not call as witnesses before these hearings novelists who have written all kinds of scare literature in the field. We tried to have the most responsible sources we possibly could and yet Dr. Ikle, Director of Arms Control and Disarmament Agency for our Government said this.

He testified that it is now possible for terrorist groups to "put a skilled team together that could fashion an explosive, should they have obtained the requisite plutonium or enriched uranium" and certainly the potential and possibility of obtaining it through theft, which would not take a great deal of time, is highly possible.

We are now looking to you for technical advice, and what is technically feasible. As we design our safeguards, we have to take into account the worst possible situation—that is a DOD phrase that is used in every option available to them—and then our response has to be in the light of what we think the worst possible situation is. Is it not possible that there is a potential for theft of nuclear materials by terrorists, against which we have to guard and protect ourselves and the world?

Dr. SEAMANS. Well, let me just make a categorical statement that we certainly have to have a strong safeguards program.

We have in our budget in ERDA a request for a $35 million increase, going from 1975 to 1976, for this purpose. This will take us up to a total safeguards program of about $120 million, so we clearly recognize the importance to this country of having a good safeguards program, just as we recognize the importance of having a good international safeguards program.

I might point out that Dr. Ray invited all the countries with whom we were working in this area to come to this country and share information in the safeguards area, and we found that quite a number of countries were interested in knowing this. So it clearly is important and we want to do everything we can to benefit from the peaceful advantages of nuclear energy and to minimize the risk.

Senator GLENN. Would the Senator yield?

Senator PERCY. I would be happy to yield.

Senator GLENN. Did any nation refuse to come?

Dr. RAY. We have no refusals.

Senator GLENN. Just another question since you mentioned India, we had some testimony before that in India, there really had been a tape-recording of plutonium-measuring devices used by an IAEA inspector that was destroyed as part of the record and that was before India exploded its nuclear device.

It was used, the obvious inference here is that we were deliberately misled by them intentionally as to what plutonium was available and what it was going to be used for.

Would you care to comment on that and whether there is any indication of why we know that plutonium is not being diverted from other purposes from India right now, by government or terrorist groups and what are we doing about it and what is IAEA doing about it?

Dr. SEAMANS. I would like to have Dr. Friedman answer that question or we can provide it for the record.

I have heard that this has happened, and I am not familiar with the specifics.

Senator PERCY. I think it may be well to have the question answered by Dr. Friedman.

Dr. Friedman, could you specifically answer that question: Does the IAEA have a program of physical security safeguards that its inspectors or inspections oversees?

Dr. FRIEDMAN. The IAEA is developing some expertise in this area. The IAEA safeguards system is not designed specifically to address the terrorist threat. That is addressed in a different manner.

I think one of your earlier questions alluded to the fact that in spite of the very intensive and effective IAEA safeguards system, the problem existed that terrorists might get material together to develop a weapon.

That problem is addressed in parallel to the IAEA safeguards system. That problem is addressed by requiring an effective physical security system to be applied before we will export strategic quantities of highly enriched uranium or plutonium.

Dr. Ray's solicitation of visitors from other countries was specifically to show them what we are doing in this area and it turned out to give us an opportunity to learn what some of the other countries were doing and in some cases, they were doing more effective work in some areas, but I guess this is not the question you originally asked me to respond to.

Senator PERCY. I would really like a very direct answer, a yes or no answer to my question.

Does the IAEA have a program of physical security safeguards that its inspectors oversee?

Dr. FRIEDMAN. It is my belief that the answer is no. Dr. Tape probably can elaborate on that.

Senator PERCY. My information is that you are correct and that is what is disturbing me.

Dr. FRIEDMAN. Well, that is why I said the IAEA system was never designed to address terrorists' activity.

It was designed, and it is extremely effective in addressing the question of national diversion, as in the India case.

The India case was not a terrorist activity. It was a national, I will not say, a diversion. It was a national effort to produce a nuclear explosive device.

Senator GLENN. How do we know that?

Dr. FRIEDMAN. How do we know it was a national effort? They admitted it.

Senator GLENN. How do we know that? They destroyed the tapes and records.

How do we know plutonium is not going to other groups? Because it is a national project, all of these things are national projects and that is what we are trying to protect.

They are destroying tapes and records; how do we know that somebody is not getting material from over there to make a bomb? We have no way of checking?

Dr. FRIEDMAN. Mr. Chairman, first of all, the testimony that addressed this subject on Wednesday, I think, I interpreted it as being a rumor.

I think there may be some more information available and perhaps again Dr. Tape can address it but we do know, based on the IAEA inspections and that rumor alluded to an inspection of the facility which is under IAEA safeguards but based on IAEA ispections, they have been able to account for all produced plutonium in the reactor, in the Indian reactor, and that is the only part of that system which is weapons grade material and that would have to be reprocessed and that is all accounted for.

Senator PERCY. But in the light of the testimony we have had as to the potential that does exist for that, would it not be well for the IAEA to have a program of physical security safeguards, of inspectors' oversee, considering the relatively modest cost of the program and the potential damage that would come if we were not tight enough in this area of safeguards?

Dr. FRIEDMAN. Well, I think we are getting a little over my head because I can only address the technical question.

I cannot address the policy question but I would say that I perceive a problem in an international organization involving itself in the internal police responsibility of a state.

I recognize the problem. I think all of us are concerned, and I think that there may be other ways of addressing the problem, but it is a real problem which all of us are concerned about.

Senator PERCY. But are we concerned about an international organization becoming too aggressive as against a diplomatic nicety or are we talking about the preservation of the human race, a concern and fear that everyone has and everyone shares and it is understandable.

I think that the world really looks to the United States to exert leadership. Although we do not have a monopoly by any means any more, we recognize we have more knowledge than any other nation on earth as to what the potential is for peaceful use and the potential is for the destructive use of nuclear energy.

In view of the potential threat, is there not a strong case to be made that we really have not done enough, that we have not exerted our leadership as a country to move the IAEA and its members toward this objective of adopting a very strong system of safeguards?

Dr. Seamans, I think it might be well if you could pick it up there.

Dr. SEAMANS. I certainly agree with the thrust of your question, that the United States has a very great responsibility in this area.

It is a very important issue, and we could never say we have done enough; however, I think we have taken our obligations to heart. I think that in the whole nuclear field, we have recognized that we cannot close the door on the peaceful uses of nuclear energy and that the right answer is for us to participate in the IAEA, to participate on a bilateral basis, to participate with supplier nations and to follow all of the leads that we possibly can in order to minimize the risk. I think that Dr. Ray and the people with her and the atomic energy people have done a commendable job.

I have a very great responsibility for this in ERDA, and I intend to take that responsibility very seriously and we have got to keep working at the problem, and we intend to do so.

Senator PERCY. Until such time as we have developed a system, however, in IAEA, is not it reasonable, taking into account the testimony that we have had and the facts we have had and the potential danger we know exists, that we take and assert the initiative in suggesting ways to upgrade physical security safeguards in other countries? We do so on the basis that this is in your national interests, our national interests, and the interests of the entire world. We do so and that we take a very aggressive leadership position in issuing proper warnings and doing it in the most effective possible manner. Is not the world really looking to us for this kind of leadership?

Dr. SEAMANS. Yes, and I think it is getting this kind of leadership myself.

In addition to the international organizations in which we participate, I might say heavily, we have our own people, we do go around and inspect.

We obviously make use of capabilities that we have around the world in our own embassies. We obviously are working closely with our contractors to improve physical security measures.

As I said before, we must use all of these. Now, possibly the IAEA could get more heavily into this area. I am not really familiar enough with the specifics of this, except to note that when different countries are participating in an international organization, although we may make recommendations, it is up to the international organization to decide exactly how it responds; and so there is a limit to what can be expected at any one time.

Senator PERCY. I would like to play the devil's advocate for just a moment. I have to really put it in that point of reference because of my high personal regard for our witnesses today, with each of whom I have had a fine personal relationship and hold in the highest esteem, not only as friends, but also your professional confidence and contributions made in your respective fields through the years. I think it is our job here to be an advocate for those who are the most skeptical and would be the most skeptical of the testimony that has been presented—11 bells and all is well; don't worry, things are going all right—because there are a great many people with whom we have talked, who have technical and scientific knowledge beyond that of the membership and staff of this committee, who are concerned, and I think I would be speaking for many of them. On page 5 of your testimony, Dr. Seamans, you say that the policy that has emerged as a "realistic approach to the real world." I am struck by that statement, because I think many would argue, and rather effectively, that the real world they see is not quite the same real world that you have pointed out.

They would point to the fact that there is no international physical security safeguards system. They would point to the fact that there is no way to know for certain whether a country to which we are exporting nuclear materials may in fact be violating the IAEA materials comparability safeguards by siphoning off small quantities of highly enriched materials for its future PNE.

I have done the very best job I possibly could have done through the intelligence sources available to us, and I say that with a basis for feeling that this has happened, there has been slippage. We do have far greater potential than is publicly known today for disaster.

They would point to a real world in which they have not, in which nations wish to achieve a peaceful and possibly explosive nuclear capability, if only as a symbol of development.

We saw in industry, when businesses needed a computer or not, when the computer age came, they all desperately wanted to get a computer because that was sort of a status symbol, of whether they were a modern progressive company.

We went through the phase after World War II, that every country had to have its own steel mill. It was a status symbol for them and now the status symbol seems to be in the field of nuclear energy. That is the real world we are living in, a pell-mell rush to acquire this technology, whether it is really justifiable and economical or not, in a particular country, simply because to be a sovereign nation, we have to have our own peaceful nuclear plant or PNE, peaceful nuclear explosion. That pressure is very great.

That is the real world I see.

A U.S. nuclear export control process would be pointed out by cynics that involves helter-skelter, at least five major departments and agencies that can only be characterized in the judgment of some people we have talked to as a nonsystem, not a real system of export control, and a growing consensus among intelligent, realistic hardheaded men of a farce, that the possibility of terrorists' use of bombs is a clear possibility as exemplified by Dr. Ikle's testimony before us a few days ago. This is the real world that many who are looking to safeguard the future of humanity are looking at.

If we were to go by the 12 pages of testimony that we have had presented by you, we could just disband our hearings and say all is well; there really is nothing further that needs to be done.

The question is whether we recognize the fact that we potentially are on the brink of a newer nuclear diplomacy and nuclear power in which we will have to respond in new ways.

Specifically, on page 9, you expressed objection to the idea that foreign safeguards be comparable to those in the United States on grounds that too many specific circumstances needed to be considered from country to country. Yet when we put a missile abroad, whether it is in Turkey or in Germany, we use the same interlock key system and safeguard system that we have in this country.

It does not matter whether the territory is Turkey or whether it is Germany, or wherever, we put the same safeguards abroad that we have at home.

In fact, I assume we even have extraordinary measures beyond that, because it is outside our own territorial limits and beyond our sovereign control to a degree.

Would you not agree that the danger of theft and diversion in some countries is greater than in others?

In France, the danger of theft may be quite minor, compared to what it might be in Argentina or in Brazil, or some other country. Is there a variance between countries that we have to take into account?

Dr. SEAMANS. Yes, there is a variance between countries, and that is the reason that I said what I did, in response to questions by Senator Glenn.

I think we have to take into account differences in their institutions. In regard to France, for example, we have compared our safeguards program with them, and they have an extremely good program from which we have benefited.

Now, to be sure there is no misunderstanding, let me just comment on your remarks about the handling of nuclear weapons.

We do handle the nuclear weapons, wherever they may be, as you pointed out, the same way, because they are the responsibility of the U.S. military services.

However, when you are talking about nuclear commercial plants, that is not so. We are not over there with a key that can turn on or off the various powerplants around the world that use nuclear energy.

We have to rely on the capability of the particular country to handle their own safeguards, and we have to recognize that the police forces, for example, in different countries are different.

The Japanese police, the British police, for example, do not carry guns. That does make a difference in how you carry out the safeguards operation, for example, in those two countries. Whether the people are armed or not obviously makes a difference on what you do under terrorist conditions.

So all of these kinds of institutional factors have to be weighed in putting together a safeguards program in a particular country.

Senator PERCY. But is it not true, Dr. Seamans, that there is a case that certainly in the cliche of the chain is no stronger than its weakest link. In this kind of a case, the danger and the threat to the whole world, or to any single country is dependent upon how assessable, how available, and how easy it is to make a theft in a country of minimal security, because of the transportability of the material and the nature of the explosion itself, which could be taken from one country but set off in another country, halfway around the world, so that all of our safeguards in this country would be for naught, if they are weak, very weak, someplace else and we simply take the position, well, this is in their national interests and we cannot really interfere too much.

Is it not in their national interests, the interests of every single country, that we try to strengthen our safeguards, every place that nuclear potential exists?

Dr. SEAMANS. That is certainly true, and I never meant in any way in my testimony to condone weakness but at the same time, to expect comparability in the sense that everybody has to do everything exactly the same way, I think is wrong.

I think every country has got to have an adequate, and, I mean a truly adequate system, and that is what we are working on to see that it is so.

Senator PERCY. I could make a case, though, for saying that there should not be comparability, where the potential threat is even greater.

There ought to be a greater safeguard, where the potential is even greater, so that the standard would be safeguards, adequate to protect against the nature of the potential threat, and would not that then be something, the real world that we live in, that we would have to take into account, if we are to adequately protect ourselves and all of the people?

Dr. SEAMANS. Exactly, if the safeguards have to be adequate for the conditions that have to be met in a particular region. That is, I am saying that does not mean that you do it necessarily the same way in every country. You have to look at what the situation is, and that is what we are attempting to do.

Senator PERCY. I think on page 8, finally, here is an area where we do have something to say about it. I think for clarification and certainly any member here, the Chairman or anyone else, could question my judgment on this, but I think on page 8, when you argue that the NRC, as a regulatory agency, should not be in a position of making final judgments "on foreign policy and a common defense," I think we could argue that is subject to question and refutation on two grounds, that in our form of Government, when we create an independent quasi-judicial regulatory commission and it is created by Congress precisely in order to make judgments on the merits and not subject to the policy imperatives of the executive branch, we have a horrendous case we are trying to put behind us but we really cannot, in effect, in Vietnam, where a unilateral decision was made by the executive branch, without the advice and consent of Congress at the outset and we concede some of the consequences that have flowed from that.

Is not it wise that we have a regulatory commission that is in a position to make its own judgments and not just accept, as we are concerned they might accept the value judgments of the executive branch and cover themselves with a memorandum in the file and do very little of their own independent analysis, analytical study and research?

Dr. SEAMANS. Of course, it is, and I do not have in my text the quote that you just referred to. I could go over with you what I have on page 8; it does not include that statement.

Senator PERCY. On page 8 that we have in draft form, it may be that we have a different text in the draft form than the original.

Dr. SEAMANS. I apologize for that.

Senator PERCY. I am concerned the proposed legislation would give what amounts to a final say in specific decisions.

It is doubtful such an independent commission should be in position of making final judgments independent of both the President and the Congress on such specific foreign matters.

Dr. SEAMANS. I deleted that last night from the statement.

Senator GLENN. I would like to pin this down once and for all. I got into this with Dr. Ray a little while ago, and I am not quite sure I got a direct answer or any answer, and I would like to make it very clear that I would like to have it very clear from all parties what the answer is, so we know how to proceed.

NRC feels they already have this veto authority. Dr. Ray believes our legislation would accord NRC this right.

Your original draft statement and you continue with what is not the final statement of the day but it indicates the same thing, that proposed legislation would give the NRC international safeguards responsibilities. NRC said they have those now. Is it your opinion they do or do not?

Dr. SEAMANS. It is my opinion they do now.

Senator GLENN. Dr. Ray, is that your opinion, they do now have that authority?

Dr. RAY. I am not sufficiently familiar with the exact reading of the status of the energy reorganization act.

My remarks were directed to the fact that the Secretary of State has foreign policy responsibility for the United States.

Dr. SEAMANS. What I am referring to is the fact that in carrying out the licensing operations——

Senator GLENN. That is the crux of what we are getting to.

Dr. SEAMANS. The final act that Dr. Ray referred to and Mr. Anders also referred to, is the licensing. If they have that responsibility and they exercise it, then clearly they could override the executive branch of the Government.

Now, I am not a lawyer and so I do not know what the Constitution might have to say about that or how it would be reviewed by the Supreme Court, but it seems to me, if you give somebody a licensing responsibility, if he is not to be a rubberstamp, then he clearly has two different ways he can make the decision: He can hold it up or he can grant it.

Senator PERCY. I would like now to turn from the draft statement to the statement you did give this morning, on page 9 at the bottom. You said we are likewise concerned with the requirement in the bill, that NRC specified a safeguards criteria for the international agreements.

Since the final decision on these agreement actions rests with the President, regulatory agencies should play an advisory, not a decisionmaking role and I think is the whole crux of it, because that runs contrary to the intent of Congress.

We want the independent agency responsive to the executive branch and, through the appointment process, responsive to the Congress, because we can advise and consent on appointments. We created the legislation but we do not want them subject to the veto of either one.

We want them out there, with no place to pass the buck but to themselves and taking the full responsibility. That is what I think concerned us, that the testimony this morning and your own feelings were contrary to the way we intended to set this up. It would be a disservice to those that had the responsibility of carrying out the charter if they did not fully understand what the intent of the Congress was and what the meaning of the law is. We want them to staff themselves, then to carry out this responsibility. We really do not feel it is wise to just have it subject to the judgment of the executive branch of the Government, subject to all kinds of diplomatic pressures, which we are well aware of. Do you want to respond to that?

Dr. SEAMANS. This statement here has to do with a criterion for international agreements. The question is in this case whether the NRC should be able to dictate, to specify specifically or whether they should be asked to advise, should be in the role of an advisor to those who are making the decisions.

I think this is a very fundamental issue and I said, I am concerned about it, and I am concerned about it, as to what this would really mean from the standpoint of negotiations that we have with many different countries.

I have only been around a short time and I am already involved in a few, and we could certainly use some good sound advice, but I am not sure I would like to be in a position of having everything specified in detail.

Senator PERCY. I know that your time is up, Dr. Seamans, and we very much appreciate your being here.

I would only point out this problem. When President Nixon went to the Mideast and committed this country to provide nuclear resources, in a sense to both Israel and Egypt, there was deep, deep concern expressed from many, many different corners and there has been a reassessment of that whole situation obviously.

We just want to be certain that safeguards are not as might be implied by some of the testimony this morning, a relative notion subject to modification or perversion by the dictates of foreign policy considerations.

We had hoped that there would be a measure of outright objectivity which constitutes an adequate materials accounting and inventory system or an adequate safeguard network, and it is that objectivity that we really want to build into it, to free the process from the political pressures and the political considerations of the moment, because those change very, very rapidly. I do hope, as one of our leading authorities in this field, that we can continue this dialog between us and have a meeting of the minds between ourselves and yourselves on the urgency of the present situation.

We very much appreciate your being here, and I am sorry we held you beyond your 12 o'clock time.

Dr. SEAMANS. I am sorry I have to leave, but we are dealing with quite a few committees of Congress.

Senator GLENN. And I know you thoroughly enjoy every hour.

Dr. SEAMANS. I wanted to say how much I appreciated the chance of being here this morning because we do share a common interest. There is no question about our objectives. The only question is the best way to carry them out.

There was one remark made earlier I would like to address myself to, that is when Senator Ribicoff was referring to the phone call one might get from the White House and it would be necessary then to be swayed and change a viewpoint as a result of such a phone call or the phone call might come from the State Department. I can assure you, if I get such a phone call, and if I feel it is not in the best interests of this country or the best interests of other nations from the safeguard point, I will not respond in a way I think is incorrect and if it really comes down that my decision will be based on what I think is right, that people do not agree with me on it, it is then they can get another Administrator for ERDA.

Senator GLENN. Dr. Seamans, I prefer to call you Bob, because of our long association, I have the utmost faith that would be the exact case with you in the job you are now in but as is fundamental of our system, we are a government of laws and government of men, you will not spend the rest of your life in the job and there is somebody we may have less faith in the future and we are trying to set up a system where people will be less scrupulous than yourself.

Senator PERCY. I would like to say the same thing. I have not the slightest doubt about your ability.

Senator GLENN. You have passed more than your time, but thank you very much. It was a pleasure to have you here, and thank you.

And, Mr. Tabor, we interrupted your presentation earlier so we could let Dr. Seamans testify, he has a time problem. Could you proceed with any statement you have to make, or read it into the record, if you prefer.

TESTIMONY OF JOHN K. TABOR, DEPUTY SECRETARY OF COMMERCE

Mr. TABOR. Mr. Chairman, I want to say I concur with your decision to accommodate Dr. Seamans, and I think it has been a most fruitful, helpful interchange for all of us who are in any way involved in this statement.

Mr. Chairman, I have filed a statement, which I believe you have. I would be content simply to file that statement and raise certain points which I regard of particular importance.

I might call particular attention to pages 7 and 8 of the statement, because I think the Department of Commerce looks at this problem less from the substantive point of view as you have been discussing it with Dr. Ray and Dr. Seamans, and more from the procedural point of view. We understand the proposal is intended to coordinate Administration policy on these matters or at least simplify the process for those who seek export licenses by providing a single point of contact, a single door. Our concern is that because of the very nature of the problem several varying departments—State, ERDA, Treasury—must retain a policy sign off. That puts the Department of Commerce, as I indicate at the bottom of page 7, in the unsatisfactory posture of being responsible for the Administration of consolidated controls while requiring written approval from those technical agencies who are far more expert than Commerce about such highly technical matters as nuclear problems, and emissions problems. The result is that the Department of Commerce has the responsibility but not the commensurate authority. I think this would result in delays, rather than simplification and acceleration as everyone would like.

Senator GLENN. Mr. Tabor, how does this differ from other commercial enterprise?

You see this as big international business, you are dealing with agricultural products, or roadbuilding machinery, everything else, the Department of Commerce conducts a lead-agency role, and you coordinate with many other agencies of Government, and I presume, depending on the seriousness of objections from any other agencies of the Government, you would refuse a license. How does this differ with respect to the Nuclear Regulatory Commission, if it says no—the safeguards are not OK—that they would have a veto?

If Dr. Ray over at the State Department has talked this all over with her people, and the people in other countries, and they say we have got some real problems with this, we are not in line with Greece, Turkey, and so they would not give a sign off on this, and I would presume you would only grant a license in the absence of any negative votes by many of the people you would be consulting on this, as you do in every other commercial venture we have overseas now.

How does this change the lead-agency concept that is common in other commercial fields, and that seems natural for businessmen to deal with in this country, inasmuch as it does involve the seriousness of nuclear spread around the world?

Mr. TABOR. There is certainly a difference in degree, Mr. Chairman.

The present arrangements including our interagency committee in which we consult involve preliminary resolution on an oral basis, while permitting differences of view to escalate right to the President if necessary.

The provisions in the act require written approvals from the outset, rather than the normal consultation. So I think there is that difference in degree procedurally.

I think there is also a difference in the degree of complexity and substance involved. When we start talking about emissions or arms sales, it seems to me you should obviously preserve the expertise of the Environmental Protection Agency, or the State Department, and the Defense Department.

Senator GLENN. Is that not the case in other areas of commerce, where you conduct the lead-agency role? Why is it any different here? I do not see the difference. Granted, it is a more technical field, but you are not expected to pass nuclear safety and safeguards questions. You have other experts who will do that for you.

That is what Mr. Anders' role is in NRC, for instance, to give you a sign on or sign off on that particular item, how is that different from sending roadbuilding machinery to Afghanistan?

Mr. TABOR. We do not consult on road graders in Afghanistan. This is not restricted in any way.

Senator GLENN. I picked the wrong example, obviously.

Mr. TABOR. There are certain products, for instance, a computer——

Senator GLENN. Yes, some of those.

Mr. TABOR [continuing]. Which are highly sought after around the world. In accordance with congressional wishes, we have developed technical expertise within our Department to deal with computer export questions. We also consult with others on this. What I am trying to say is, that if the purpose is to consolidate, simplify, and accelerate export administration, I do not see that the act will gain that as an end result.

We are going to have a door. The problem is we have experienced very considerable delays in our current export administration program, and this has been a source of great concern to Members of Congress, particularly in connection with getting clearances from the other agencies who are not always eager to license a particular export.

Senator GLENN. We are trying to accomplish several things, and I think one of them is to keep American business in this field as much as possible.

It has some advantages, as Dr. Seamans' testimony points out, if you would read that, he points out very well the fact the more we are involved in these things, imperfect though our arrangements may be, the more influence we have over them, and to say we back off from supplying anybody in the world, means we will have less influence in the future in helping determine the direction these things go, imperfect though our arrangements are. I agree with him on that—just from an international balance-of-payments position, from the business standpoint, if somebody will furnish this material, we want to be that somebody. But at the same time, if we can have the safeguards, and can influence the way this whole situation develops, we can be very influential. As has been pointed out in several of the statements, the technology is spreading around the world, whether we supply it or not, we might as well supply in and be an influence in it.

This bill sets up a method of doing this, through normal commercial channels as much as possible, but keeping those very strict controls that Mr. Anders and his Commission can exercise, and the State Department, through the normal commercial channels that your Department exercises.

That seems to me a normalizing of things that does not overcomplicate—in fact it streamlines—the system. If I am a businessman, I know one spot to go, the businessmen in this Nation are accustomed to using the Department of Commerce in that way, so it normalizes that whole relationship, and still tries to keep it under safeguards control. So, I do not see the difference between this and other methods of conducting business in this country.

Mr. Tabor. I think there are three matters I would like to mention in response, Mr. Chairman.

No. 1, as you point out, it is desirable, imperfect as our arrangements are, to engage in trade involving high technology items where we can have proper safeguards, particularly in the nuclear field. We in the Department of Commerce concur, and in the early part of my statement I make that point.

The second aspect is whether the Act will streamline and facilitate the process of permitting high technology exports to the extent these exports are in the national interest. I think that we give the appearance of streamlining and facilitating, by saying just knock on Commerce's door; that is all you have to do. My concern is that the right to knock on Commerce's door is to a high degree illusory. You in the Congress can impose this responsibility upon us and business and industry can come to our door. The problem is business and industry will think it is easy—all they have to do is see Tabor or his colleagues and they will obtain export licenses. But we have here a complicated mechanism, more complicated as a matter of degree than we have had. May I spell that out.

The act requires a written sign off by the concerned departments on every single item involved as a result of the legislation. Currently we do not have that requirement. Breaking it down, probably 90 to 95 percent of our licensing is quite straight forward and does not involve a clearance at all. This is because we have gotten Federal guidelines from the various departments automatically to license exports of say computers of up to such and such a strength or such and such a size head. This reserves the hard cases, 10 or 12 percent of the cases for real investigation and considered decision. It is these hard cases which are delayed, but this bill would impose the requirement of a written signoff on all matters, thus creating the possibility of additional delays.

Senator GLENN. You point out very properly the complicated nature of this, and to my way of thinking, that makes the case for the bill.

It argues on the passage of the package, because what is a businessman to face, if he does not have somebody to guide him through the regulations and criteria he must face as an individual from the outside, with nowhere to turn, and someone with expertise in the Department of Commerce that can lend their expertise to help solve this mass of bureaucratic complex regulatory area, he needs someone as a lead agency to help him through this thing if we are going to control it.

Senator Percy has a time restraint, and before you start here, Dr. Tape, we are getting late today.

Would you rather proceed today, as soon as we are finished here, or would you rather be the lead witness?

Dr. TAPE. I would like to proceed today, because some of the points that were raised, have me on the edge of my chair, and I would like to respond.

Senator GLENN. I saw you a little agitated back there.

We will wind this up as fast as we can and get on to your testimony. The hour is getting late, and we will not be able to run too much longer.

Senator Percy?

Senator PERCY. Thank you.

Dr. Ray, I do not know whether to address you as a professor, or as Chairman of the Commission, or Assistant Secretary of the Department of State, or what, but you have been in a very unique role, and have a unique opportunity.

Would you care to comment on the way you see the decisionmaking powers of NRC now, how independent they should be by the statute, as provided, from the Executive or Congressional dictates to them, and whether they really should not have the facilities to make these licensing decisions right on their own?

Dr. RAY. Senator Percy, with respect to domestic activities, I completely agree with you. That was a point which in all of our testimony in support of the Energy Reorganization Act, we made quite clear.

It is an essential requirement for independent regulatory body to be able to have final authority over matters in safeguard and security areas, et cetera, but when it comes to a matter of international activities, it puts it into a different form. While I agree fundamentally that nuclear safeguards is a world-wide problem, nevertheless, we do live in a world of sovereign nations and we cannot dictate what other nations can do. Our system of Government does delegate foreign policy responsibilities to the Secretary of State, and when it gets into the international activities in the nuclear field, we feel it is essential that those international responsibilities remain in the executive branch, and, therefore, subject to the overall policy direction of the Secretary of State and the President of the United States.

Senator PERCY. When you say we cannot dictate to other nations, is it not putting it somewhat different than that though. As a condition precedent to our providing technological knowhow and experience and sharing knowledge, and providing materials and equipment, et cetera, don't we have a perfect right to say, "these are the conditions under which we will provide this? Now, you can either turn it down or accept it, but that is the condition under which we will provide it, and no other conditions will prevail."

Dr. RAY. That is what happens in the Agreements for Cooperation, the conditions under which things will be exported, the requirements for safeguards, the requirements for inspection, the requirements for physical security are all spelled out.

In fact, we do do that, and that is the reason we do not have Agreements for Cooperation with certain countries, because we have not been able to work out an arrangement that is satisfactory to us.

I think if one looked closely at the existing Agreements for Cooperation, one would find these things are in fact spelled out, and any export must take place under the conditions required by those agreements.

Senator PERCY. Would you agree it is desirable to expand the number of signatories of the NPT?

Dr. RAY. That has been the cornerstone of our policy, and as I presented last September at the last annual meeting of the IAEA on behalf of the United States, we fully supported and encouraged further signatories to the NPT.

Furthermore, we pledged U.S. support to the IAEA, in furtherance of their desire to improve the international safeguards, and to help the IAEA to develop standards for better physical security systems.

Senator PERCY. Is it possible, and I am sure that you would take that position, but is it possible, or advisable to try to develop some sort of inducement to increase the number? For example, could a concessional rate be given on export-import loans to finance U.S. reactor sales to NPT members, provided, of course, the recipient countries have competent safeguards?

Dr. RAY. I believe we should be doing everything we can to give every inducement to countries to encourage them to become members of the Nonproliferation Treaty, and to encourage them to develop their nuclear power programs in responsible fashion.

I believe that is best done by working cooperatively with them, and in finding better ways to implement the requirements of the NPT to which we pledge assistance for peaceful programs, and that we should be giving a good deal more attention on how best we can assist them, rather than trying to put up barriers.

Senator PERCY. When you say we should be doing everything we can, I accept that as including then every possible inducement to make it so attractive. It may cost us a little something, but it will also cost us something if we do not offer every inducement.

Dr. RAY. I would go even further, Senator, and say the more we can do to assist a country develop a stable economic base, and that means having a dependable supply of energy, because energy is fundamental to business, to stabilize any economy, the more we can do to assist, the less likely other countries will be drawn towards wanting to develop their military capabilities, because the more stable the world is, and the less threatened countries feel, the better safeguards we will have.

Senator PERCY. Last week an expert witness testified that we must intensify our efforts to encourage the multinational ownership and operation of chemical processing, fuel fabrication, associated nuclear material, storage facilities.

Do you agree that this is important?

Dr. Ray. It is a little more complex question than can be answered easily yes or no.

I think we have to recognize that fuel fabrication is already being done, domestically, in a number of countries.

Fuel reprocessing is already a fact in various countries. Various countries already within their own domestic capability, either can or are separating plutonium, reprocessing fuel, and so on.

To the extent that it is possible, I believe that it is both economically sound, and also will provide for better safeguards, to have the countries cooperate on a regional and multi-national basis, both in the reprocessing, as well as in the fabrication and enrichment business.

That is most likely to come about, I think, as it becomes clear it is economically advantageous to do so.

Senator Percy. Is it not true that very few countries are engaging in the process that you described though?

Dr. Ray. Fabricating their own fuel? No, quite a few are.

For each of these situations, fuel fabrication, reprocessing, and enrichment, it would be quite possible to provide to you a country-by-country breakdown as to which countries are in fact already doing it, either on a large or a small scale, and which countries have the capability internally to do it.

We have that information that can be provided, if you want it.

Senator Percy. I think it would be helpful to have that supplied for the record.

(The material follows:)

URANIUM ENRICHMENT

EXISTING CAPABILITY

Country	Location	Process	Capability/comment
United Kingdom	Capenhurst	Gaseous diffusion	400,000 SWU/yr. for power reactor fuel.
France	Pierrelatte	do	Small, for defense purposes.
U.S.S.R	(3 plants)		Built for defense purposes. Since 1968, have offered toll enrichment services for power reactor fuel.
China (Peoples Republic of)			Probably small, for defense purposes.

PLANNED AND PROJECTED CAPABILITY AND DEVELOPMENT PROGRAMS

Country and/or organizations	Location	Process	Comment
URENCO (United Kingdom, Netherlands, and West Germany).	Capenhurst, United Kingdom.	Gas centrifuge	Project capability of at least 2,000,000 SWU/yr by 1980.
Eurodif (France, Belgium, Spain, and Italy).	Rhone Valley	Gaseous diffusion	Project capability of 4,700,000 SWU/yr by 1979 and 9,300,000 SWU/yr by 1981.
Japan		Gas centrifuge and gaseous diffusion.	Modest development program.
West Germany	Karlsruhe	Separation nozzle	Small pilot plant built in 1967; viability of process to be determined in late 1970's.
South Africa	Valindaba	A stationary walled centrifuge using UF_6 in H_2.	5,000,000 SWU plant planned to be in partial operation in 1984 with full operation in 1986.
Other	Various locations (laboratory scale).	Rotary plasma, laser isotope, possibly other processes.	Studies and small developmental program.

FOREIGN[1] LIGHT WATER REACTOR FUEL FABRICATION FACILITIES

Country	Plant	Owner	Capacity (tons UO_2/year)
Belgium	Dessel	MMN	200
France	FBFC	Franco-Belge de Fabrication de Combustibles.	200
Do	SICN	SICN	50
Do	SICREL	SICREL	NA
Do	Eurofuel	Eurofuel	NA
Do	Romans	CERCA	80
West Germany	RUB	Reaktor Brennelemente Union	550
Do		Alkem	45
Do		BBR	NA
Do		Nuklear Brennstoff	NA
Do		KRT	220
Italy	Bosco Marengo	Fabricazoni Nucleari	200
Do	Saluggia	Coren	60
Do	LFCEC	Wenese	20
Japan	Yokosuka	JNF	560
Do	Tokai Mura	Nuclear Fuel Industries	40
Do	Tokai	Mitsubishi	420
Netherlands	Interfuel	Interfuel	30
Sweden	Stockholm	ASEA Atom	50-100
Do	Vasteras	do	50-100
Do		do	350
United Kingdom	Springfields	BNFL	400
Spain		ENUSA	NA

[1] Excludes Communist bloc countries.

FUEL REPROCESSING

EXISTING CAPABILITIES, PRODUCTION SCALE

Country	Facility	Type of fuels	Capacity (metric tons, U/Year)
United Kingdom	British Nuclear Fuels, Ltd., Windscale Works.[1]	Metal, low enrichment	2,500.
France	La Hague	do	800.
	Marcoule		1,000.
Russia	?	?	?.
Belgium	Eurochemic-Mol	Metal and oxide, low enrichment, and metal, high enriched.	75 low enriched; 1.25 higher enriched (plant shut down in mid-1974).
India	Trombay	Metal and oxide, low enrichment.	100.
China (Peoples Republic of)	?	?	?.

[1] Modification was made at Windscale plant for processing low enrichment oxide (LWR type) fuels; this part of plant is scheduled for 1975 startup.

PLANNED CAPABILITIES, PRODUCTION SCALE

Country and/or organization	Facility	Type of fuels	Year available	Capacity metric tons U/year
United reprocessors, a loose marketing and technology exchange organization among France, Germany, and United Kingdom.	La Hague (France)	UO_2, low enrichment.	1976 80	Startup at 100 in 1976, increasing to 800 by 1980, by modification to existing plant.
	Windscale (United Kingdom).	do	1981	800.
	KEWA (Germany)	do	1984	1, 600.

PROJECTED CAPABILITY, SMALL SCALE PLANTS, AND DEVELOPMENT ACTIVITY

Country	Facility	Type of fuels	Comment
Argentina	Ezliza	Research reactor	Small pilot plant.
Belgium	Eurochemic plant, MOL	UO_2, low enrichment	Consideration is being given to restart of this plant under Belgium ownership and expand its capacity to 300 MTU/yr.
France	La Hague, Fontenay	Breeder (U-Pu oxide)	Small pilot plant.
Germany	WAK, Karlsruhe	Breeder, UO_2	200 kg/day pilot plant in operation.
	KFA, Juelich	Graphite	2 kg/day pilot plant, scheduled to start 1977.
India	Tarapur	UO_2, low enrichment	Small plant, startup imminent.
Italy	EUREX-I-Salugga	UO_2 and metal	Small pilot plant.
	ITREC-Rotondella	Thorium/uranium	Do.
	Unnamed	UO_2, low enrichment	500 MTU/yr plant projection 1985.
Japan	PNC, Tokai-Mura	do	Small plant, scheduled startup 1976.
		do	Large plant being considered.
Spain	Juan Vigon Center	Research reactor	Small pilot plant and plutonium chemistry laboratory.
Sweden		UO_2, low enrichment	500 MTU/yr plant being considered.
United Kingdom	Dounreay	Advanced fuels, breeder, etc	Pilot plant in operation.
Other			Several other countries have expressed interest in construction of plants for reprocessing of LWR fuels. However, very little work is underway and it is expected that they would have to rely on technology of others. France, particularly, appears to be interested in building such plants, and marketing technology.

Senator PERCY. What obstacles do you find, and how can Congress help you overcome them to encouraging multinational ownership and operation of chemical processing, fuel fabrication, et cetera?

Dr. RAY. I think the very best thing that can be done is to strengthen the United States position in the IAEA, strengthen our cooperation with the International Atomic Energy Authority, and provide for more funding. Like every other body, IAEA is strapped for finances. Finally we should provide for an easier mechanism for getting our expertise available to IAEA.

I am sure that Dr. Tabor will think of other things, but in my mind, the greatest advantage would be working through the international organization.

Senator PERCY. I am tempted to ask how you are getting along in the bureaucracy, as against running your own show.

Dr. RAY. It is different. I will say it is different.

Senator PERCY. It might be an undiplomatic question.

Senator GLENN. The Chairman rules you are permitted to take the fifth.

Senator PERCY. I might ask Secretary Tabor how he feels to be the Acting Secretary of the Department of Commerce, but I will not ask that.

Very much in line with the chairman's questioning. I would like to just take a moment for the record, to quickly summarize now what Secretary Tabor has indicated:

First: The NRC licenses exports of the nuclear materials and nuclear facilities, ERDA licenses exports of nuclear technologies, the State Department licenses exports of products and technologies, specifically design, or products of nuclear weapons, and the Commerce Department licenses exports of all other nuclear technologies, including components, even though these may be important components of reactors.

If these components constitute substantially less than a complete reactor, the Commerce Department licenses those.

Commerce also licenses nuclear propulsion equipment and technology, and in issuing such licenses, Commerce consults not only with NRC, but with ERDA. At least two agencies then are consulted with, and if we take into account DOD's advisory role, we count another agency.

In line with the Chairman's question, I put it to you again, does not this seem a rather diffused organizational structure? As you stated, it is somewhat confusing. Is there, for instance, some help needed to unscramble it, is there a formally established interagency committee whose task it is to attempt to coordinate these multi-organizational tasks, and is that in existence right now?

Mr. Tabor. Let me say it is a pleasure to be here, and I have benefited from the thoughtful interchange between both the Chairman and yourself, Dr. Seamans and Dr. Ray.

Second: With regard to whether there is presently a formal structure to coordinate the items that are dealt with in the bill—the nuclear matters, the munitions, and the trading with the enemy matters—to the best of my knowledge, and I will ask my general counsel for Domestic and International Business to comment, there is not a formal structure.

There is a formal structure for all the items which are now in Commerce, where there is, I believe, an interagency Operating Committee, and an Advisory Committee on export policy which includes private sector representation. The Operating Committee has two levels; the Secretarial level of Defense, Commerce and AEC, which is now ERDA, and a working level, that deals with a great range of products, other than the munitions, nuclear powerplant, and trading with the enemy titles.

Third: In responding to the desirability of the act; following up the Chairman's questions, I think one of our great concerns is that in the present structure, the responsibility for issuing an export license is clearly in Commerce.

We have to consult, but we have that final responsibility of issuing the license. I believe in fixed responsibility. When you have two people responsible, no one is responsible.

As I perceive the proposal in the bill, you take, say in munitions, all of the authority formerly in the Secretary of State, and transfer it to the Secretary of Commerce, but say he cannot implement this responsibility unless the Secretary of State says so.

I am afraid that what you are doing here is under the guise of administrative simplification, making two people responsible for one decision. I notice the Chairman is shaking his head. Still I think, for example, in the negative case, where NRC, or ERDA says no, we still have to make a decision, and we are likely to make a decision that fully respects the negative, and your bill requires that. But suppose they say yes.

Senator Glenn. And State says no, it will be no.

Mr. Tabor. No, under your bill, as I see it, if we were concerned with a munitions export, we would go to State. If they sign off, then we can license the export. If we exercise the substantive decisionmaking power to say yes, and we also have the full authority and power that was formerly the Secretary of State's, we might have to develop a full substantive capability equal to what State has in order to know whether we were exercising our responsibility properly.

Senator GLENN. Will you yield just a moment?

You would be responsible for coordinating all of the activities, not determining whether it is a foreign policy matter, or whether the Department of Defense is involved, or whether the Nuclear Regulatory Commission said this is a bad one, and we should not go, because nobody will tell us what they will do with the plutonium. As we see this, however, you will be coordinating the aspects. But if other people will object, NRC objects, DOD, State, you will not grant the license, obviously.

The line of your questioning, I gathered was that you were trying to make nuclear decisions, nobody envisions the Department of Commerce doing that. That is the last thing we have in mind with this bill.

Mr. TABOR. But I am concerned that the act does not make it that clear, Mr. Chairman. It says there are transferred to the Secretary, and the Secretary shall perform such functions of the Nuclear Regulatory Commission as were formerly in the AEC. It also transfers similar powers to the Secretary of Commerce from State and other agencies.

As it relates to the exports of arms, the act does not say the Secretary of Commerce is a coordinator. It says that the Secretary of Commerce must undertake these activities, and we would feel accountable to do just that. We are not just a coordinator according to the act.

Even if we get a sign off from State as is required, I do not think we can say we have no responsibility under the act. Thus, it requires us to develop a substantial capability enabling us to make a responsible decision which is also being made in the other place. I think that is a problem.

Senator PERCY. What we have is a common objective here to guarantee that the national interest in nuclear and nonproliferation and diversion is preserved. When we started these hearings, we said we are orbiting this piece of legislation to start the debate, to just challenge whether or not what we have now is adequate, but we have no pride of authorship in it.

It was developed as a result of talking to a great many people, including members of the Administration, but we would really welcome alternate proposals if the Reorganization Act of 1974 is not, in your judgment, the best way to reorganize ourselves, then we can have a counter-proposal, or an alternate piece of legislation that would either improve what we are doing, or ratify everything we are doing is now as perfect as we can set it up, and take into account all of the dangers that have been brought out in the expert testimony. We just feel in this field we should be absolutely certain that we are organized as best we can to do the most effective and efficient job taking into account all of the safeguards that are needed and necessary. We would welcome very much any suggestions right now, or that you or any member of the Administration would like to put forward as we give consideration to this and go into markup on the legislation.

Mr. TABOR. Well, we must obviously reflect on this in depth. There are only three options: One is that you leave the responsibility for policy decisions where they are; another is that you transfer responsibility to Commerce; and a third is that you do both. I think that, with all due respect, the draftsman of the bill has done both. If we are to carry out that kind of responsibility in the Department of Commerce, and be responsible, then I think we must develop a capability for that kind of substantive decision, which will parallel to a high degree the substantive capability in the other departments.

Senator GLENN. The Senator from Illinois has indicated he has had as one of his objectives to get discussion started, and I think we have succeeded pre-eminently in that regard. I, in fact, know that the time is getting away from us, and I have many more questions, but we will have to end your testimony.

Dr. Tape is here, of course, and I do appreciate this very much. I think it has been very, very instructive as an interchange, and one that we are going to have to continue.

We will have other witnesses testify too, and we would appreciate very much your cooperative activities in the future, and we appreciate your statement here this morning, and we look forward to more of it.

Dr. RAY. Mr. Chairman, Mr. Vest would like to comment.

Mr. VEST. I want to bring out a point of fact, when we talk about munitions control, as I take it, the objective of the legislation is to prove how we manage the flow within the nuclear and nonproliferation area.

When we are dealing with the Office of Munitions Control, that category, which involves nuclear weapons, design, equipment, et cetera, it is only 1 percent of the activity of the Office of Nuclear Controls, so that we are talking about an activity which goes to a much broader scale, to the world of export of weapons, which is a very serious policy matter indeed, but it is only what we are talking about in a direct sense, it is one percent, so, therefore, we will be creating duplication, because if that whole area has to be transferred to Commerce, it is massively duplicated.

Senator GLENN. Thank you very much.

[The prepared statements of Dr. Robert C. Seamans, Administrator, Energy Research and Development Administration, and of Mr. John K. Tabor, Acting Secretary of Commerce follow:]

STATEMENT OF DR. ROBERT C. SEAMANS

ADMINISTRATOR,

ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION

Thank you for the opportunity to express my views on U.S. nuclear export programs and policies. I would like to begin with a brief review of our international nuclear policy, but I will also outline our views on a few key aspects of the proposed Export Reorganization Act of 1975.

A realistic approach to U.S. policy must begin with the recognition that nuclear energy is a two-edged sword. The atom has proven to be a viable source of low cost electrical energy which is assuming an increasingly important role in meeting the world's energy needs. However, we cannot fail to recognize that some of the materials involved in the use of this technology can be applied to nuclear weapons development.

The two-edged character of the atom was recognized by President Eisenhower when he spoke before the UN General Assembly on December 8, 1953. He proposed the establishment of an Atoms for Peace Program and the International Atomic Energy Agency in order to use nuclear technology for the peaceful purposes of mankind. At the same time, his proposal recognized that effective controls had to be placed on peaceful nuclear activities in order to ensure against their use for military purposes.

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The Congress strongly endorsed President Eisenhower's proposal with the passage of the Atomic Energy Act of 1954. Since then the United States has promoted international cooperation in a wide variety of peaceful applications of nuclear energy. Our agreements for cooperation with other nations contain a guarantee by the governments involved that U.S.-supplied nuclear equipment, materials, and their products will be used only for peaceful purposes, and that they will be subject to safeguards acceptable to the United States.

The basic philosophy expressed by President Eisenhower has been and continues to be a realistic and responsible approach to our international nuclear policy.

I realize that there are some who would disagree with this statement. In their opinion, the Atoms for Peace Program has been a misguided and dangerous policy because it has provided many nations with the basic technological know-how to produce materials which can be used to build nuclear weapons.

This argument, however, does not take account of the nature of scientific and technological growth. Even before President Eisenhower's speech, several nations had already uncovered the secrets of the atom, and it was only a question of time and cost before others acquired a capability for nuclear weapons development.

Thus, we have to examine what the consequences would have been in the absence of an Atoms for Peace Program. The most important consequence is, in my view, readily apparent. Countries would have gone on to establish their own independent, nationalistic nuclear programs without any external assistance. As a result, many nations would have had little incentive to commit their programs to outside restraints or controls.

In contrast, the Atoms for Peace Program has enabled the United States to exercise its considerable influence in establishing a workable structure of international safeguards and controls which has received the political support and endorsement of most nations of the world.

U.S. contributions to this structure have been many and varied. It was the initiative of the United States which led to the establishment of the IAEA and its safeguards system. We have provided the IAEA with the results of our safeguards programs and research and development efforts. The United States had done more in this area than any other nation. No safeguards system can be perfect, but we are constantly striving to improve the IAEA's effectiveness through our financial, technical and political support. Last September, Secretary Kissinger assured the UN General Assembly that the United States will intensify its efforts to strengthen the IAEA safeguards system.

The U.S. has also been instrumental in establishing the Non-Proliferation Treaty which provides a sound political basis for discouraging the spread of nuclear weapons. Under the terms of this treaty, non-nuclear-weapon states party to the treaty forswear the right to manufacture or acquire nuclear weapons or other nuclear explosives and undertake to accept IAEA safeguards on all peaceful nuclear activities within their territories. All parties to the treaty are also obliged to require IAEA safeguards on exports of source or special nuclear material to any non-nuclear-weapon state. The political and legal commitments made under the NPT are a crucial factor in preventing the proliferation of nuclear weapons.

U.S. export controls provide tight restrictions on the export of nuclear materials, facilities, and key elements of nuclear fuel cycle technology. In addition, the U.S. has been active in working with other supplier nations to develop common guidelines for defining critical nuclear exports on which IAEA safeguards would be imposed, and has consistently pressed for strong controls on the export of critical technology.

The U.S. has also been in the forefront in working toward adequate physical security measures on an international basis. Physical security is, of course, a national responsibility. However, the U.S. is encouraging effective measures in other countries by bilateral exchanges of information, by its support of an international convention on physical security and by its own physical protection policies and development efforts. We have also made major contributions toward the IAEA efforts to develop physical security recommendations. These have been made available to member states for guidance in establishing national physical security programs.

Recently we adopted policies requiring that no future license or authorization be granted on the export and/or the retransfer of strategic quantities of highly enriched uranium and plutonium unless the recipient government has established physical security measures acceptable to the United States.

ERDA staff is preparing background materials on the contributions which the U.S. has made over the years in supporting the development and strengthening of both international safeguards and physical security measures.[1] I expect these materials to be completed shortly and I would like to submit them for the record so that it may be of use to the members of the committee during their deliberations.

I will be the first to admit that the fabric of international controls which we have been instrumental in creating -- non-proliferation policies, safeguards and physical security systems -- does not provide us with an ideal solution in the best of all possible worlds. What has emerged, however, is a realistic approach to the real world.

The United States does not have a monopoly on the supply of nuclear materials, equipment or technology. Most of the industrial nations of the world have the financial and technological resources to expand their own nuclear industries independent of the United States. Many others have either launched major nuclear programs or have plans under way. I have asked ERDA staff to prepare some materials for the record which should give some idea of the scope of international nuclear trade as well as the extent of other nation's capabilities in all stages of the fuel cycle, including uranium enrichment, power reactors and chemical reprocessing.[2]

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[1] See Enclosure 1

Unilateral U.S. actions cannot alter this situation. Ill-conceived U.S. policies, no matter how well intentioned, could cripple U.S. nuclear exports and bring about disastrous consequences. Our major concern here is not the loss of world markets or balance of payments problems. As important as these are, they are secondary to the major concern, namely, a dangerous erosion of our influence in international nuclear affairs.

Other countries are pursuing vigorous and energetic nuclear export policies. The U.S. must be in a position, through its active involvement in the world market, to establish cooperative mechanisms with other suppliers to avoid a competition based on minimizing safeguards and other controls. We must continue to persuade these countries to impose proper safeguards and physical security measures on their nuclear exports. We would have little chance of achieving this objective if we chose to retire from the world market.

In addition, one of the principal reasons non-nuclear weapon states agreed to the establishment of the NPT and its safeguards provisions was the assurance given under Article IV by the nuclear weapon states (but particularly by the U.S.) that they would continue to assist in the further development of their peaceful nuclear programs. These nations might undertake a serious reappraisal of the whole NPT structure if we were to fail in our commitments.

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[2] See Enclosure 2.

In order to maintain a major voice in shaping future international nuclear policies, the U.S. also must have an efficient and flexible policy mechanism. In essence, this means a highly coordinated effort by all appropriate members of the Executive Branch in close cooperation with the Congress.

Under the current system, the National Security Council (NSC), sets overall policy within which agencies coordinate their policy and technical roles. The NSC structure, together with the close working relationships among all appropriate elements of the Executive Branch, has thus far ensured a high level of interagency coordination. Because this entire process is under the effective control and direction of the President, we are able to conduct a well integrated and flexible policy which can be adjusted to the rapidly changing world of nuclear technology and nuclear diplomacy.

Under our unique system of export controls, the Congress is a partner in the development of policy through its role in approving or disapproving of proposed agreements for cooperation. The strong and continued interest of Congress in all these issues is vital to a sound international nuclear policy. The present system fulfills the two-fold objective of providing an effective and efficient decision-making process while assuring a healthy and productive system of checks and balances.

The proposed Export Reorganization Act of 1975 would, from our perspective, impair the effectiveness of that Congressional-Executive partnership in several respects.

The Congressional-Executive partnership should be the principal mechanism for setting our basic policies. In contrast the proposed bill seems to place excessive weight on the export licensing process as the means for determining questions of international nuclear policy.

In particular, we are concerned that in requiring NRC certification of foreign safeguards, the proposed legislation places a responsibility on the NRC which would be extremely difficult for it to execute. The determination of the adequacy of foreign safeguards is a complex matter, not simply involving a review of regulations, facilities, and practices. It also involves a detailed and confidential exchange of information, an assessment of intelligence data, and an analysis of pertinent political factors. Obviously, an organization independent from the Executive Branch would not be in a position to make these judgments. It is inadvisable, in our view, to require of the NRC an important action which it does not possess the capability to discharge.

We fully recognize that the NRC has a valuable contribution to make through regulatory establishment of the criteria for the domestic "safeguards" program. Certainly this program, which is concerned mainly with the protection of materials against theft or seizure by individuals or small groups, is an important aspect of our total range of protective measures.

The international scene, however, presents additional considerations beyond those in the domestic safeguards programs. These additional considerations involve how to deter foreign governments from diverting nuclear materials to non-peaceful uses. Clearly, dealing with these considerations should be the business of Executive Branch agencies and not an independent regulatory agency.

We also have a problem with the requirement that safeguards in foreign countries be comparable to those in the United States. ERDA believes that "comparability" would be an unworkable standard for international safeguards. Systems vary widely from country to country, and too many special circumstances have to be considered.

We are likewise concerned with the requirement in the bill that NRC specify the safeguards criteria for the international agreements. Since the final decision on these agreements rests with the President, regulatory agencies should play an advisory not a decision-making role.

The current method for licensing exports of nuclear materials was created by the split of functions berween ERDA and the NRC by the Energy Reorganization Act of 1974. ERDA is responsible for authorizing distribution of nuclear materials under government to government agreements. NRC is responsible for issuing licenses for commercial export of nuclear materials and reactors. The test which must be applied in either case is whether the proposed action would be inimical to the common defense and security or to the health or safety of the public. Clearly a uniform application of these statutory criteria is called for.

We recognize that in its role as an independent regulatory agency, the NRC needs to receive an analysis of these areas from the Executive Branch before it can apply the statutory tests in each case. Along with other agencies of the Executive Branch, we have been developing with the NRC effective procedures for accomplishing this task.

I would like to say a few final words on one aspect of the decision-making process with which I am most familiar -- the programs and activities of the Energy Research and Development Administration. As an heir of AEC, ERDA has a lengthy history in the national security and technical aspects of nuclear energy. The strong scientific and technical foundation which ERDA has developed over the years as well as its extensive experience in all aspects of our international nuclear policies is an invaluable national asset.

This asset constitutes a whole which is far greater than the sum of its parts. Its expertise would not be fully and effectively utilized if staff members were dispersed among several other agencies. There is a close, interlocking, and mutually supportive relationship among all ERDA elements -- safeguards and physical security, export control, weapons development, classification and intelligence programs as well as the extensive programs in the national laboratories and the whole spectrum of ERDA's international activities in the energy field. These cannot be separated without losing the benefits of the close and effective cooperation that has prevailed in the past. For example, the U.S. export control system covers thousands of items ranging from common articles such as ferrous pipes to highly sophisticated new technologies such as laser isotope separation. The policy-making process must include people who are actively working in these technologies in order to help determine what should be controlled and what conditions should be attached to any authorization.

ERDA's unique resources must continue to play a substantive role if the US is to have an international policy which is capable of adjusting to the rapidly changing and worldwide developments in nuclear energy.

To conclude my remarks, I believe that we must continue to press for strict and effective international controls. An efficient and flexible policy mechanism is essential for this task. Rearrangement of licensing procedures would not in itself enhance the common defense and security. Achievement of that goal requires the close cooperation of all agencies and departments, which are under the direction and guidance of the President, and which are in a position to make substantive contributions to the decision-making process.

I fully support the efforts of the Congress to assure effective international controls and to minimize the spread of nuclear weapons, and I will be pleased to offer all the assistance I can in achieving these important objectives.

(Enclosure 1)

CONTRIBUTIONS MADE BY THE U.S. IN SUPPORT OF DEVELOPMENT AND STRENGTHENING OF INTERNATIONAL SAFEGUARDS AND PHYSICAL SECURITY MEASURES

Early U.S. Efforts

After the failure of the initial U.S. efforts for international control of nuclear energy for peaceful purposes (i.e., the Baruch plan of the mid-1940s), the idea of international control achieved its first foothold as a result of the U.S. proposal for an International Atomic Energy Agency (IAEA). The U.S. proposals for this Agency, in 1954, specified that "...in order to assure that allocated fissionable material is being used for the purpose for which it was allocated, the Agency would have the continuing authority to prescribe certain design and operating conditions, require accountability and operating records, specify disposition of by-product fissionable materials and wastes, retain the rights of monitoring and require progress reports. The Agency would also have authority to verify the status of allocated material inventories and to verify compliance with the terms of issuance."

In July of 1955, the USSR agreed to a U.S. proposal for a joint study of the issues and declared its readiness to participate in negotiations on the creation of the IAEA. The agreement culminated in unanimous approval of the Agency Statute. This Statute directs the Agency to "ensure so far as it is able that assistance provided by it or at its request or under its supervision or control is not used in such a way as to further any military purpose." To this end the Agency is authorized "to establish and administer safeguards designed to ensure that special fissionable and other materials, services, equipment, facilities and information made available by the Agency ... will not be used in such a way as to further any military purpose." In Article 12 of the Statute the Agency is authorized to send into the territory of States subject to IAEA safeguards inspectors who "shall have access at all times to all places and data and to any person who by reason of his occupation deals with materials, equipment or facilities which are required by this Statute to be safeguarded, as necessary to account for source and special fissionable materials."

The U.S. negotiators at the conference which developed this Statute pressed for the strongest acceptable international controls to be specified in the Statute. The controls acceptable to the other nations were of the nature of detecting diversions of nuclear material. The sanctions provided for in the Statute stem from the reporting of any discovered diversion to the Agency's Board of Governors and the UN Security Council and General Assembly. There were no provisions made for the IAEA to physically protect the safeguarded material inasmuch as this would imply the right of the Agency inspectors to apply force within the jurisdiction of a member State. Therefore, physical protection activities have never been a part of IAEA safeguards implementation.

IAEA Systems

When the U.S. ratified the IAEA Statute, Agency safeguards were looked upon as the eventual, desirable avenue for the application of the safeguards contained in the U.S. bilateral Agreements for Cooperation developed in connection with the Atoms for Peace program. As the IAEA safeguards system was developed, provisions were included in the U.S. Agreements for Cooperation contemplating transfer of safeguards responsibilities to the Agency. (The safeguards provisions developed for the U.S. bilateral agreements had the same basic purpose as IAEA safeguards, i.e., to detect and deter a national government's diversion of nuclear material contrary to its international commitment.)

In the early years of IAEA development (i.e., 1958 through 1960) the United States provided key leadership in developing the first Agency safeguards system which was finally adopted by the Agency in 1961. This system only covered the small research reactors which were subject to Agency safeguards at that time. In the subsequent years as further demands were put on the Agency safeguards program, additional systems were developed through technical working groups and committees in which the U.S. was a key participant providing major technical input. The list of these systems is as follows:

System		Set Forth
Nature	Name	In Document
The first system	The Agency's Safeguards System (1961)	INFCIRC/26
The 1961 system as extended to cover large reactor facilities	The Agency's Safeguards System (1961, as extended in 1964)	INFCIRC/26 and Add. 1
The revised system	The Agency's Safeguards System (1965)	INFCIRC/66

System (Continued) Nature	Name	Set Forth In Document
The revised system with additional provisions for reprocessing plants	The Agency's Safeguards System (1965 as Provisionally Extended in 1966)	INFCIRC/66/Rev.1
The revised system with further additional provisions for safeguarded nuclear material in conversion plants and fabrication plants	The Agency's Safeguards System (1965, as Provisionally Extended in 1966 and 1968)	INFCIRC/66/Rev. 2
The system to be applied under NPT agreements	The Structure and Content of Agreements Between the Agency & States Required in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons (1971)	INFCIRC/153

The U.S. involvement in these efforts included (a) developing a U.S. position, (b) participation in the series of meetings during which each draft document was developed, and (c) obtaining expert U.S. technical advice at all stages of development of the system.

EURATOM

At the same time that IAEA safeguards were being developed, the United States in recognition of the importance of the objective of a united Europe, fostered and gave technical support to the development of a multinational safeguards system covering the EURATOM countries. This safeguards program is conducted by the EURATOM organization. During this period of development, a Joint US/EURATOM Technical Working Group was formed and there were exchanges of technical visits between U.S. and EURATOM safeguards experts.

Safeguards Exercises

In addition to the early system development work, another category of assistance has been the U.S. unilateral offers to have IAEA safeguards applied or specific procedures developed and tested at operating U.S. nuclear facilities. The major exercise was the 1962 "Four Reactor

Agreement," which was in effect for almost 8 years. It included the application of safeguards during the processing of 2 batches of spent fuel elements from the U.S. Yankee power reactor by 15-man resident teams of IAEA inspectors at the Nuclear Fuel Services Co. chemical reprocessing plant at West Valley, New York, in 1967 and 1969. The Yankee Atomic Electric Company and the NFS Company cooperated fully in this exercise as did the AEC's national laboratories at Argonne and Brookhaven.

Another exercise was made possible through the cooperation of Westinghouse and involved IAEA safeguards staff studying in detail the nuclear material control system at the Westinghouse Fuel Fabrication Plant in Columbia, South Carolina, in 1971, as part of a program to develop its inspection procedures for such facilities.

Past R&D Projects

Major AEC (ERDA) projects for R&D to assist international safeguards are listed as follows:

Date	Contractor	Cost	Subject
1959	Westinghouse	$1,200,000	Techniques and Devices for Nuclear Materials Control
1960	Thomson Ramo-Wooldridge	100,000	Study of Mathematical Models & Decision Functions
1961	General Electric	100,000	Nuclear Materials Control Manual
1965	General Electric	135,000	Tamper-indicating Safing System
1965-1966	Battelle Northwest Laboratories, Richland, Washington	117,000	(Four studies on safeguarding facilities and instrument development)
1966	Nuclear Fuel Services	151,000	Safeguards Procedure Manual for a Chemical Reprocessing Plant
1968/ Present	Technical Support Organization (TSO) of the Brookhaven National Laboratory has spent an average of 1.5 man-years per year on IAEA safeguards support.		

Past R&D Projects (continued)

Date	Contractor
1968/ Present	Battelle Northwest Laboratories (BNWL), Richland, Washington, has spent an average of 1 man-year per year on IAEA safeguards support

Also, in 1974, a joint ACDA-ERDA-IAEA project to develop and test several on-line safeguards instruments at the GE Mid-West Fuel Recovery Plant was in operation when GE decided to stop work on the plant. Consideration is being given to test the salvageable equipment in another plant.

In addition, the results of uncleassified R&D performed for the U.S. domestic safeguards program have routinely been made available to the IAEA.

Technical Meetings and Consultants

One of the primary means the IAEA has to develop its safeguards program has been to hold meetings of specialists to discuss specific potential safeguards problem areas and propose solutions. Most areas of the safeguards program have been covered over the past years including, for example, ADP applications, an international network of analytical laboratories, statistical concepts, organization of the Safeguards Department, safeguards system analysis, safeguarding isotope enrichment plants, safeguards design information requirements, use of isotopic composition data, etc. The meetings have ranged from 2 or 3 consultants working rather informally for a few days, to delegations representing several countries meeting for a week or more of formal sessions. The U.S. has participated in nearly all of these meetings, being represented by people from AEC (ERDA) Headquarters, laboratories, and contractors; the ACDA and State Department; and U.S. industry and universities. In many cases, U.S. participation has involved separate preliminary R&D efforts and meetings with U.S. experts and occasionally with experts of other nations to prepare the U.S. positions.

ACDA Role

In addition to the joint projects cited here, the Arms Control and Disarmament Agency has independently funded several projects which support effective international safeguards, including some highly sophisticated techniques in the area of tamper indicating surveillance and containment measures (e.g., fiber optic seals, unattended cameras, track etch monitors, etc.) The AEC (ERDA) and ACDA support programs are fully coordinated.

Current U.S. Projects

Current U.S. projects in support of effective IAEA safeguards include:

1. Perimeter safeguards study: The U.S., recognizing the unique and difficult problems of future international safeguards at isotopic separation plants, has undertaken a special support project in this area involving (a) participation in IAEA technical advisory meetings on the subject; (b) formation of a U.S. Technical Working Group (of experts from ERDA, ACDA, Brookhaven, LASL, Sandia Laboratory, Union Carbide, and Goodyear Atomic); (c) joint development activities with the UK, Dutch, and German centrifuge group; and (d) R&D contracts for specific hardware needs (e.g., \$100,000 specifically budgeted for LASL for FY-1975). ACDA is funding complementary work in this area.

2. Development of statistical and technical bases for IAEA inspection strategies (BNWL; \$50,000 specifically budgeted for FY-1975). ACDA is funding complementary work in this area at BNWL.

3. IAEA safeguards planning exercise at a power reactor (Dresden), and a low-enriched fuel fabrication plant (GE/Wilmington, N.C.) to give the IAEA additional experience in and constructive criticism of their inspection planning procedures for such facilities. This experience can be directly applicable to their safeguarding of similar facilities in non-nuclear weapons states.

4. Study and Report on "Elements of a State's System of Accountability for and Control of Nuclear Material." This work, being done at the request of IAEA, has been assigned to TSO, Brookhaven. The product will be used by IAEA in its preparation for an Advisory Group Meeting on the subject in July 1975. The object is to provide detailed guidance for other nations in setting up domestic safeguards accountability and control systems (parallel to the IAEA's "Gray Book" guidelines on physical security).

5. Review and comments by U.S. experts of draft chapters of the IAEA's Safeguards Technical Manual.

6. Develop technology of isotopic correlation techniques and their possible application to safeguards problems (primarily an ACDA effort).

7. Based on procedures used by the IAEA in analyzing specific facilities from a safeguards viewpoint, the U.S. is developing possible procedures for the IAEA to use in verifying a plant operator's nuclear material accountability data. Such studies are being done for uranium fuel fabrication plants, plutonium mixed oxide fuel fabrication plants and for spent fuel reprocessing plants (for Pu recovery).

Training

In addition, over the years the United States has made known its willingness, and has provided opportunities for individuals from other countries to come to the United States for special programs of training in the area of nuclear material safeguards. Several nations have taken advantage of this offer. Also 69 individuals from other countries have attended the AEC-sponsored Safeguards training courses at the Argonne National Laboratory over the years from 1968 to 1972.

IAEA Staffing

Also, the U.S. has recruited highly qualified professionals in the safeguards field from U. S. industry, the AEC and AEC contractors, to serve on the safeguards staff of the IAEA. There have been U.S. nationals on the staff since the beginning of the Agency and, currently, 9 of the 72 professionals in the Agency's Department of Safeguards & Inspection are U.S. nationals, the majority of which hold senior positions.

Physical Security

As noted above, physical security is not an area in which its Statute grants authority to the IAEA. Despite this limitation and in view of the marked increase of international terrorism in the early 1970s, the Agency saw a legitimate role for itself in convening experts in the area of physical security of nuclear material in order to develop guidelines which could be used by States, if they so wished, in developing their own national systems to physically protect nuclear material. The outcome of this effort was a booklet which was published by the IAEA in June 1972 entitled "Recommendations for the Physical Protection of Nuclear

Material." The Agency reconvened a group of experts again early in 1975 to revise, update and expand the original guidelines. In both of these sessions the United States played a major role in providing technical content and substance to these guidelines.

The United States offered, during the September 1974 general conference of the IAEA, to have technical discussions with any interested nations on the subject of physical protection systems. Following the expression of interest for these kind of discussions by several nations, we have developed a program which includes meetings with U.S. technical experts in Washington and at the Sandia Laboratories in Albuquerque, New Mexico, where demonstrations of security equipment are given. Several nations have participated in this program and several more are planning to participate.

(Enclosure 2)

STATISTICS ON

THE WORLD NUCLEAR INDUSTRY

AND

US AGREEMENTS FOR COOPERATION AND RELATED SAFEGUARDS

U.S.-TYPE NUCLEAR POWERPLANTS ABROAD 1/ OPERATING IN CONSTRUCTION OR ON ORDER, AS OF JUNE 1, 1974

[Megawatts electrical]

Country and plant	In operation	In construction or on order	NSSS supplier
Austria			
Tulln 1		700	KWU
Belgium			
Tihange		870	ACLF Group
Doel-1		390	ACECO
Doel-2		390	ACECO
Doel-3		900	FRAM/ACECO
Tihange-2		900	FRAM/ACECO
Finland			
Loviisa-1		440	U.S.S.R.
Loviisa-2		440	U.S.S.R.
Finland-3		600	ASEA
Finland-4		600	ASEA
Olkiluoto		660	ASEA Atom
France			
Sena	266		ACEO/FRA/W 2/
Fessenheim-1		890	Framatome
Fessenheim-2		890	Framatome
Bugey-2		925	Framatome
Bugey-3		925	Framatome
Bugey-4		925	Framatome
Bugey-5		925	Framatome
Gravelines B1		925	Framatome
Gravelines B2		925	Framatome
Gravelines B3		925	Framatome
Gravelines B4		925	Framatome
Tricastin-1		925	Framatome
Tricastin-2		925	Framatome
Tricastin-3		925	Framatome
Tricastin-4		925	Framatome
St. Laurent-3		971	ALST/SOGERCA. 3/
St. Laurent-4		971	ALST/SOGERCA. 3/
Caux-1		750	Framatome
Caux-2		750	Framatome
Caux-3		750	Framatome
Caux-4		750	Framatome
Dampierre-1		905	Framatome
Dampierre-2		905	Framatome

Footnotes at end of table.

U.S.-TYPE NUCLEAR POWERPLANTS ABROAD[1/] OPERATING IN CONSTRUCTION OR ON ORDER, AS OF JUNE 1, 1974

[Megawatts electrical]

Country and plant	In operation	In construction or on order	NSSS supplier
Germany			
KRB Gundremmingen-1	237		GE
KWL Lingen	256		AEG
KWO Obrigheim	328		Siemens
KKS Strade	630		Siemens
KKW Wuergassen	612		KWU
Biblis-1	1,150		KWU
Biblis-2		1,240	KWU
Brunsbuettel		770	KWU
KKP Philipsburg-1		864	KWU
KKP Philipsburg-2		864	KWU
Unterweser		1,230	KWU
Nordenham		1,300	KWU
Neckarwestheim-1		762	KWU
KKI Isar		870	KWU
Muelheim-Kaerlich		1,215	BBC-BBR
Kruemmel		1,260	KWU
WYHL-SUD-KWS-1		1,250	KWU
WYHL-SUD-KWS-2		1,250	KWU
GKN Neckarwestheim-2		1,300	KWU
Dettingen		1,200	KWU
BWAG-1-Grafenrheinfeld		1,300	KWU
BWAG-2		1,300	KWU
BWAG-3		1,300	KWU
Gundremmingen-2		1,250	KWU
Gundremmingen-3		1,250	KWU
Grohnde/Oberweser		1,300	KWU
RWE-6		1,240	KWU
RWE-7		1,240	KWU
RWE-8		1,240	KWU
RWE-9		1,240	KWU
RWE-10		1,240	KWU
RWE-11		1,240	KWU
VEW-A		1,240	KWU
VWE-B		1,200	KWU

Footnotes at end of table.

U.S.-TYPE NUCLEAR POWERPLANTS ABROAD[1] OPERATING, IN CONSTRUCTION OR ON ORDER, AS OF JUNE 1, 1974

[Megawatts electrical]

Country and plant	In operation	In construction or on order	NSSS supplier
Iran:			
Iran-1		1,200	KWU
Iran-2		1,200	KWU
Iran-3		900	Framatome
Iran-4		900	Framatome
Italy:			
SENN	150		GE[4]
SELNI	247		W.[5]
ENEL-4		783	AMN-GETSCO
ENEL-5		952	ENI
ENEL-6		982	AMN
ENEL-8		982	GE
Netherlands:			
Borselle	450		KWU
Spain:			
Zorita-1	153		W
Nuclenor	460		GE
Lemoniz-1		902	W
Lemoniz-2		902	W
Almaraz-1		902	W
Almaraz-2		902	W
ASCO-1		902	W
ASCO-2		902	W
Cofrente		902	W
Undesignated		974	GE
Switzerland:			
Beznau-1	350		W/BB
Beznau-2	350		W/BBC
Muhleberg	306		GETSCO/BB
Kaiseraugst		850	GE/Sogerca
Leibstadt		850	GETSCO/BB
Gosgen		1,100	KWU
Graben		1,140	BBC/GE
Brazil: Angra-1		626	W.
Mexico:			
Laguna Verde-1		600	GE
Laguna Verde-2		600	GE

Footnotes at end of table.

U.S.-TYPE NUCLEAR POWERPLANTS ABROAD[1/] OPERATING, IN CONSTRUCTION OR ON ORDER, AS OF JUNE 1, 1974

(Megawatts electrical]

Country and plant	In operation	In construction or on order	NSSS supplier
Sweden:			
Oskarshamn-1	440		ASEA
Oskarshamn-2		580	ASEA
Ringhals-1		760	ASEA
Ringhals-2		900	W/Monitor
Ringhals-3		900	W
Ringhals-4		900	W
Barseback-1		580	ASEA
Barseback-2		580	ASEA
Forsmark-1		900	ASEA
Forsmark-2		900	ASEA
Oskarshamn-3		900	ASEA
Japan:			
Tsuruga	340		GE
Mihama-1	320		W
Mihama-2	470		MAPI
Mihama-3		781	MHI
Fukushima-1	460		GE
Fukushima-2		784	GE/Toshiba
Fukushima-3		784	Toshiba
Fukushima-4		784	Hitachi
Fukushima-5		784	Toshiba
Fukushima-6		1,100	GE/Toshiba
Fukushima-II-1		1,100	Toshiba
Takahama-1		780	W/MAPI
Takahama-2		780	MHI
Shimane-1		460	Hitachi
Genkai-1		559	MHI
Oi-1		1,122	W/MHI
Oi-2		1,122	W/MHI
Hamaoka-1		500	Toshiba
Hamaoka-2		750	Toshiba
Onagawa-1		500	Toshiba
Tokai Mura-2		1,100	GE-HITACHI
Ikata-1		559	MHI
India:			
Tarapur-1	200		GE
Tarapur-2	200		GE

Footnotes at end of table.

U.S.-TYPE NUCLEAR POWERPLANTS ABROAD[1] OPERATING, IN CONSTRUCTION OR ON ORDER, AS OF JUNE 1, 1974

[Megawatts electrical]

Country and plant	In operation	In construction or on order	NSSS supplier
Korea:			
Ko-Ri-1		564	W
Ko-Ri-2		564	W
Ko-Ri-3		600	AECL
Ko-Ri-4		600	AECL
Philippines:			
Philippine-1		626	W
Philippine-2		626	W
Taiwan:			
Chinshan-1		604	GE
Chinshan-2		604	GE
Kuosheng-1		800	GE
Kuosheng-2		800	GE
Taipower-5		992	W
Taipower-6		992	W
Yugoslavia:			
KRSKO		600	W.

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[1] Abroad refers to non-soviet bloc foreign countries.

[2] Framatome, of which Westinghouse is important shareholder, employs PWR technology.

[3] Industrial group, associated with CGE, which holds GE license for use of BWR technology.

[4] General Electric.

[5] Westinghouse.

NON-U.S.-TYPE NUCLEAR POWERPLANTS ABROAD, OPERATING, IN CONSTRUCTION OR ON ORDER

(Megawatts electrical)

Country and plant	In Operation	In Construction or On Order	Supplier
Argentina:			
Atucha-1	318		Siemens
Atucha-2		600	AECL
Cordoba		600	AECL
Canada:			
Douglas Point	308		AECL
Gentilly-1	250		AECL
Pickering-1	508		AECL
Pickering-2	508		AECL
Pickering-3	508		AECL
Pickering-4	508		AECL
Pickering-5		750	AECL
Bruce-1		750	AECL
Bruce-2		750	AECL
Bruce-3		750	AECL
Bruce-4		750	AECL
Gentilly-2		600	AECL
Gentilly-3		500	AECL
New Brunswick-1		600	AECL
Bruce-5		732	AECL
Bruce-6		732	AECL
Bruce-7		732	AECL
Bruce-8		732	AECL
Pickering-6		508	AECL
Pickering-7		508	AECL
Pickering-8		508	AECL
Czechoslovakia: Bohunice A-1	110		SKODA
India:			
Rapp-1	200		AECL
Rapp-2		200	
Italy: Latina	200		TNPG
Japan: Tokai Mura-1	157		BNDC
Pakistan: Kanupp	125		CGE
South Korea:			
Ko-Ri-3		600	AECL
Ko-Ri-4		600	AECL
Spain: Vandellos	487		EDF
France:			
Phenix	250		
Chinon-2	200		
Chinon-3	480		
St. Laurent-1	480		
St. Laurent-2	515		
Bugey-1	540		
United Kingdom:			
Oldbury-1	300		TNPG
Oldbury-2	300		TNPG
Winfrith	94		UKAEA

NON-U.S.-TYPE NUCLEAR POWERPLANTS ABROAD, OPERATING, IN CONSTRUCTION OR ON ORDER

(Megawatts electrical)

Country and plant	In Operation	In Construction or On Order	Supplier
United Kingdom (Continued)			
Calder Hall-1	50		UKAEA
Calder Hall-2	50		UKAEA
Calder Hall-3	50		UKAEA
Calder Hall-4	50		UKAEA
Chapel Cross-1	50		UKAEA
Chapel Cross-2	50		UKAEA
Chapel Cross-3	50		UKAEA
Chapel Cross-4	50		UKAEA
Berkeley-1	138		TNPG
Berkeley-2	138		TNPG
Bradwell-1	150		TNPG
Bradwell-2	150		TNPG
Hunterston A-1	160		GEC
Hunterston A-2	160		GEC
Trawsfynyd-1	250		APC
Trawsfynyd-2	250		APC
Hinkley Point A-1	250		EE-BW-TW
Hinkley Point A-2	250		EE-BW-TW
Dungeness A-1	275		TNPG
Dungeness A-2	275		TNPG
Sizewell A-1	290		EE-BW-TW
Sizewell A-2	290		EE-BW-TW
Wylfa-1	590		EE-BW-TW
Wylfa-2	590		EE-BW-TW
Windscale	35		UKAEA
Hinkley Point B-1		625	TNPG
Hinkley Point B-2		625	TNPG
PFR		254	UKAEA
Dungeness B-1		625	APC
Dungeness B-2		625	APC
Hunterston B-1		625	GEC
Hunterston B-2		625	GEC
Hartlepool-1		625	BNDC
Hartlepool-2		625	BNDC
Sizewell B-1		660	EE-BW-TW
Sizewell B-2		660	EE-BW-TW
Sizewell B-3		660	EE-BW-TW
Sizewell B-4		660	EE-BW-TW
Heysham-1		625	BNDC
Heysham-2		625	BNDC
Dungeness C-1		1,300	TNPG
Dungeness C-2		1,300	TNPG
Dungeness C-3		1,300	TNPG

WORLD RESOURCES OF URANIUM
[Tons U_3O_8]

	Reasonably Assured	Estimated Additional	Total
$10:			
Australia	300,000	50,000	350,000
Canada	240,000	250,000	490,000
South Africa and South West Africa	260,000	10,000	270,000
France, Niger, Gabon, C.A.R.	140,000	70,000	210,000
Other[1]	60,000	60,000	120,000
Foreign subtotal	1,000,000	440,000	1,440,000
United States[2]	340,000	700,000	1,040,000
$10 subtotal (rounded)	1,340,000	1,140,000	2,480,000
$10-15:			
Australia	80,000	40,000	120,000
Canada	160,000	280,000	440,000
South Africa	80,000	30,000	110,000
Sweden[4]	350,000	50,000	400,000
France, Niger, Gabon, C.A.R.	40,000	50,000	90,000
Other	30,000	60,000	90,000
Foreign subtotal	740,000	510,000	1,250,000
United States[2]	180,000	300,000	480,000
$10-15 subtotal	920,000	810,000	1,730,000
Less than $15 subtotal (rounded)	2,260,000	1,950,000	4,210,000

Footnotes at end of table

	Reasonably Assured	Estimated Additional	Total
$15-30:[3]			
Canada	100,000	300,000	400,000
South Africa	55,000	70,000	125,000
Sweden[4]	150,000	200,000	350,000
Spain	15,000	250,000	265,000
Other	70,000	140,000	210,000
Foreign subtotal	390,000	960,000	1,350,000
United States[2]	180,000	700,000	880,000
$15-30 subtotal	570,000	1,660,000	2,230,000
Grand total (rounded)	2,830,000	3,610,000	6,440,000

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[1] Argentina, Brazil, Denmark, Finland, India, Italy, Japan, Mexico, Portugal, Spain, Turkey, Yugoslavia, Zaire.

[2] Does not include 90,000 tons U_3O_8 by product of phosphate and copper through year 2000.

[3] ENEA/IAEA September 1967.

[4] Expected to be a source of only limited production.

WORLD URANIUM PRODUCTION

	1969		1970		1971	
	tonnes U	short tons U_3O_8	tonnes U	short tons U_3O_8	tonnes U	short tons U_3O_8
Argentina	42	55	45	60	45	60
Australia	254	330	254	330	-------	-------
Canada	3,430	4,450	3,530	4,580	3,830	4,980
France	1,180	1,530	1,250	1,630	1,250	1,630
Gabon	500	650	400	520	540	700
Germany	16	21	24	31	18	23
Japan	------	------	------	------	------	------
Mexico	30	40	------	------	------	------
Niger	------	------	------	------	430	560
Portugal	94	122	------	------	81	105
South Africa	3,080	4,000	3,167	4,117	3,220	4,186
Spain	55	72	51	66	60	78
Sweden	29	38	14	18	8	10
United States of America	8,900	11,600	9,900	12,900	9,500	12,300
Total	17,600	22,900	18,650	24,250	18,950	24,630

CURRENT AND ANTICIPATED FOREIGN ENRICHING PRODUCTION CAPACITY AND SEPARATIVE WORK REQUIREMENTS

[In millions of separative work units]

Country	1975	1979	1981	1983	1985
U.S.S.R.[1]	7-10	7-10	7-10	7-10	7-10
Eurodif[6]		3.5	10.5	10.5	10.5
Urenco[2]		.4	2.0	4.0	10.0
United Kingdom/Capenhurst	.4	.4	.4	.4	.4
France/Pierrelatte[3]	.4	.4	.4	.4	.4
South Africa[4]			2.4	8.0	8.0
Canada[4]				8.0	8.0
Japan					.7-.8
Total foreign capacity[5]	7.8	11.7	22.7	38.3	45.0
Total foreign separative work requirements[7]	5.1	14.3	20.9	27.8	39.8
Foreign separative work requirements[7] (excluding Soviet bloc and People's Republic of China)	4.0	11.1	16.1	20.4	28.5
U.S. Enriching Production Capacity	18.2	26.5	28.8	35.8	44.9
U.S. Separative Work Requirements[8]	6.1	12.6	18.9	17.8	18.9

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[1] Capacity data for U.S.S.R. enrichment plant is unpublished; capacity range shown is taken from an unauthenticated and unclassified source.

[2] Includes the United Kingdom, Germany, and the Netherlands.

[3] Primarily for military requirements; not economically competitive for commercial power reactor fuel production.

[4] Unlike French-led, Eurodif and Urenco who are each firmly committed to construction of enriching capacity, the South African and Canadian projects are still in the exploratory stages and may not meet the production schedule shown. Hence foreign capacity shown for latter years may be overstated. South African pilot enrichment plant now operating.

[5] Of the amounts shown, the Eurodif capacity is reportedly fully committed with 50 percent to France (10% of which Iran now has an option on), and 50 percent to Italy, Spain, Belgium, and Japan for delivery 1980-89; for Urenco, approximately 60 percent of planned 1981 production of 2,500,000 separative work units, committed by contract or letter of intent to United Kingdom and German utilities for delivery

through mid-eighties. The USSR has recently concluded with non-Soviet-bloc countries a number of enrichment contracts for about 8,500,000 separative work units for delivery through about 1990.

[6] Planned capacity shown does not include that for second Eurodif plant, currently under discussion and scheduled for possible launching late 1975 to early 1976. Europe, Canada and Australia under consideration as sites for Eurodif II.

[7] Based on ERDA's Planning and Analysis Forecast for 1975, using .3 tails assay.

[8] Domestic deliveries committed under enrichment services contracts, based on transaction tails assay, plus U.S. Government requirements.

STATUS OF FOREIGN URANIUM ENRICHING SERVICES ACTIVITIES-APR. 1, 1975

1. U.S.S.R.

Customer country: Firm signing contract	Amount (mt SWU)[1]	End use/reactor to be fueled	Delivery Date	Comments
A. CONTRACTS WITH THE WEST				
France:				
Commissariat a l'Energie	250	Fessenheim-1	1973-74	
Atomique (CEA)	3500	Unspecified	1979-83	
Italy:Agip Nucleare	About 4200	Unspecified	1972-83	
West Germany:				
Rheinisch-Westfalisches	600	Biblis-B	1974-77	
Elektrizitatswerk (RWE)	3100	Muelheim-Karlich	1978-90	Estimate based on approximate reload requirement for eac reactor through 1990 assuming 75% powerplant availability and 0.3% tails.
Kraftwerk Union	2600	Iran (2)	1979-80	
Gemeinschaftskernkraftwerk Neckar (GKN)	About 600	Neckarwestheim	1976-80	Options for reloads, 1981-85.
Gesellschaft fur Kernforschung (GFK)		Niederaichbach	NA	Permanent shutdown announced. Disposition of contracted amount not known.
Nuklear-Chemie und-Metallurgie (NUKEM)	1350	Various	1976-80	
Various	About 500	Grafenrheinfeld, Krummel	1976-77	Option for reloads, dates not available
Belgium:Synatom	1300	Doel-3,Tihange-2	1979-85	
Sweden:Svensk Kernbransleforsorining	300	Unspecified	1979	Option for 1100 mt SWU for delivery 1980-89.
Finland:Teollisuuden Voima Oy (TVO)	300	Olkiluoto-1	1977-79	Option for 350 mt SWU for delivery 1980-85.
Spain:Empresa Nacional del Uranio (Enusa)	5100	Unspecified	1978-79	
Austria:Gemeinschaftskraftwerk Stein	1260	Stein	1978;1980-89	
United Kingdom:CEGB	1000	Various	1980-89	Partial reload requirements for 2 SGHWR's.

[1] Separative work unit. This is the unit of measurement of uranium enrichment production.

STATUS OF FOREIGN URANIUM ENRICHING SERVICES ACTIVITIES-APR. 1, 1975-CONTINUED

Customer country: Buyer/user	Amount (mtSWU)	End use/reactor to be fueled	Delivery Date	Comments
B. POTENTIAL COMMITMENTS				
Japan:NA	1000/yr	NA	1976-2000	USSR has offered at least 1000 mt SWU annually beginning in 1976 and reportedly woul prefer to supply 3 to 4 times that much.
U.S.:General Electric	100	Foreign reactors not specified	1974	Authorized to conclude contract with USSR but no action taken.
	3500		1974-94	
Switzerland:NA	NA	NA	NA	Reports of talks in 1973 concerning Soviet provision of enrichment services No firm date.
West Germany:KWU	NA	Proposed Kaliningrad reactors		Reportedly, KWU to purchase natural uranium on free world market with toll enrichment in USSR.
2. EURODIF (FRANCE)[1]				
A. REPORTED AGREEMENTS/CONTRACTS				
Japan:Federation of electrical power companies representing 9 utilities.	**1000 yr**	**To be shared by 9 utilities**	**1980-89**	**Agreement signed 1/26/74, contract signed 6/27/74.**
Spain:NA	**400**	**NA**	**1979**	**Spain reportedly has given Eurodif a letter of intent for these amounts which total 3900 mtSWU.**
	500		**1980**	
	600		**1981**	
	700		**1982**	
	800		**1983**	
	900		**1984**	
Switzerland:NA	**200 or 1000**	**Kaiseraugst**	**1977-89**	**Contract figures of 200 and 1000 mtSWU reported. One sourc indicates France's CEA will supply enrichment for the first core and firs 2 reloads for delivery 1977 thru 1979 with Eurodif supplying subsequen 9 reloads thru 1989**

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[1] Eurodif's production has been reported as already sold for a 12-yr period. However not all contracts & amounts of separative work are known

STATUS OF FOREIGN URANIUM ENRICHING SERVICES ACTIVITIES-APR. 1, 1975-CONTINUED

2. EURODIF (FRANCE)-continued

Customer country: Buyer/user	Amount (mtSWU)	End use/reactor to be fueled	Delivery Date	Comments
A. REPORTED AGREEMENTS/CONTRACTS-continued				
West Germany: RWE, EVS	300	2 reactors currently under construction	1981	These 2 utilities have placed orders with Eurodif.
	120		1982	
	120		1983	
	120		1984	
B. POTENTIAL COMMITMENTS				
Belgium: NA	800/yr	NA	Post 1980	Annual order expected to be around 800 mtSWU. No firm contracts.
France: EdF	3000/yr	NA	NA	Unconfirmed report that EdF has placed an order for this amount annually for 10 years. No firm data on contract. Estimates of EdF' requirements from Eurodif amount to 4500/yr.
Iran: NA	NA	French-supplied reactors	NA	Under terms of recent Franco-Iranian agreement, Iran will have an option to receive 10% of Eurodif's production.
Italy: CNEN, AGIP	800/yr	NA	1981-82	Italy's estimated requirements from Eurodif. It has bee reported Eurodif ha requested Italy to accept first delivery in 1979--2 years in advance of that given in the estimate.
	1600/yr	NA	1983	
	2000/yr	NA	1984-88	
	2400/yr	NA	1989-90	

3. URENCO (UNITED KINGDOM-NETHERLANDS-FEDERAL REPUBLIC OF GERMANY)[1]

Customer country: Buyer/user	Amount (mtSWU)	End use/reactor to be fueled	Delivery Date	Comments
A. REPORTED AGREEMENTS				
West Germany, United Kingdom 5 utilities	270	NA	1977	5 utilities in West Germany have signed
	340		1978	

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[1] Data pertaining to URENCO sales are conflicting and generally not verified. Most reports indicate commitments of about 2000 mtSWU for delivery in 1980; figures for total orders covering 10-yr contracts range from 9000 to 20,000 mtSWU.

STATUS OF FOREIGN URANIUM ENRICHING SERVICES ACTIVITIES-APR. 1, 1975-CONTINUED

3. URENCO (UNITED KINGDOM-NETHERLANDS-FEDERAL REPUBLIC OF GERMANY)-continued

Customer country: Buyer/user	Amount (mtSWU)	End use/reactor to be fueled	Delivery Date	Comments
West Germany, UK 5 utilities (cont'd)	750		1979	letters of intent
	1250		1980	for these amounts.
West Germany, Netherlands 6 utilities	750	NA	1980	Negotiations with 6 other utilities for orders expecte to bring the tota to over 2000 mtSWU for delivery in 19
Switzerland:NA	NA	NA	NA	Reported to have placed an order wit URENCO.
B. POTENTIAL COMMITMENTS				
France:Electricite de France	NA	NA	NA	Unconfirmed reports in April 1974 that EdF planned to discuss a contract with URENCO. No further data.
Japan:NA	NA	NA	NA	Reported discuss negotiations for post-1980 supply.
Spain:ENUSA	NA	NA	NA	Discussions with Urenco as part of Spain's plans to diversify source of supply.

ACTUAL & PROJECTED NUCLEAR POWER EXPORT REVENUES
SELECTED FISCAL YEARS - BILLIONS OF DOLLARS

	Cumulative thru FY 1974	1975	1980	1985	1990	1995
Enrichment Services[1]	.7	.2	.4	.7	1.1	1.9
Production Facilities & Other Nuclear Power Related Equipment[2]	3.2	1.0	1.1	1.9	3.5	4.3
Total Nuclear Power Exports	3.9	1.2	1.5	2.6	4.6	6.2

[1] Enrichment revenues through FY 1974 are actual. Projected export revenues effective FY 75 are based on the price in effect January 1975 of $42.10 per separative work unit and assumes U.S. will capture in FY 85 and beyond some 45% of projected foreign enrichment demand including Soviet bloc and Peoples Republic of China

[2] Projected nuclear power equipment export revenues assumes that the U.S. will furnish 10-15% of supplier country requirements and up to 100% of non-supplier country requirements.

ACTUAL AND PLANNED NON-U.S. NUCLEAR FUEL REPROCESSING CAPABILITIES

Country Facility	Fuel Type	Capacity Operating	 Planned
Germany			
WAK-Karlsruhe	UO_2 Enriched to 3%	200 kg UO_2/day, 200 days/yr. (1970)	
KFA, Juelich	Graphite		2 kg/day pilot plant, scheduled 1977
KEWA	UO_2		1,000 Mg U/yr. (1981)
France			
Cap de la Hague	Gas-graphite, light water, and heavy water reactor fuel enriched to 5%	1,250 Mg U/yr. or 5 Mg U/day, 250 days/yr. (1966)	800 Mg U/yr. of which 400 Mg U capacity available 1976 & 400 Mg U in 1978.
AT 1-la Hague	Rapsodie FBR fuel (U-Pu Oxide)	1.5 kg/day (1968)	
Marcoule	Production reactor natural U metal	300-600 Mg U/yr. (1958)	
ATTILA-Fontenay	U-Pu Oxide	Small pilot plant	
HAO-la Hague	High burnup oxide U or Pu enr. U oxide		800-900 Mg U/yr. or 8 Mg Pu Oxide/yr.

Country Facility	Fuel Type	Capacity	
		Operating	Planned
Italy			
EUREX-1-Saluggia	MTR-type up to 98% enriched	1.2 kg U/day, 250 days/yr. (1969)	
	Ceramic up to 5% enriched	100 kg U/day, 250 days/yr.	
	Mixed Oxides (PuO_2) up to 15% Pu	50 kg U/day, 250 days/year	
ITREC-Rotondella	ThO_2-UO_2	15 kg mixed oxide/day (250 days/yr.) (1969)	
Unnamed	UO_2		500 Mg U/yr. (Sched. 1985)
Belgium			
Eurochemic-Mol (ENEA)	Metal	300 kg U/day (250 days/yr.) (1966)	Out of operation since 1974; restart of plant with expanded capacity to 300 Mg U/yr. under consideration
	Ceramic up to 5%	300 kg U/day (250 days/yr.) (1966)	
	MTR-high enriched	5 Kg/day (250 days/yr.) (1966)	

Country Facility	Fuel Type	Capacity	
		Operating	Planned
UK			
Windscale (BNFL)	Low enriched UO_2	400 Mg U/yr. (1970)	800 Mg UO_2/yr. (early 1980s)
	U metal, natural	2,500 Mg U/yr.	
Dounreay	Test reactor HEU	10 Mg U/yr. (1958)	
	Valloy FBR fuel	10 Mg U/yr. (1958)	
Japan			
Tokai-Mura/PNC	UO_2 up to 3% enr.		210 Mg U/yr. (late 1975-76)
Private Plant - Tokai (?)	UO_2 up to 3% enr.		900 Mg U/yr. (1980-82)
Tokai (?)	UO_2 up to 3% enr.		1,500 Mg U/yr. (1982)
India			
Trombay	U metal fuel or UO_2	350 kg U/day (U metal) design cap. 700 kg U/day (U metal) possible (1964)	
Tarapur	UO_2 enr. to 3%	Small plant (1971)	
Canada			
Chalk River Pilot Plant	Nat. U	Small (1949)	

Country Facility	Fuel Type	Capacity	
		Operating	Planned
Sweden	UO_2		500 Mg U/yr. considered
USSR	U metal - low enriched	N.A.	

FOREIGN[1] LIGHT WATER REACTOR FUEL FABRICATION FACILITIES

Country	Plant	Owner	U.S. Equity Participation	Capacity (Tons UO_2 Year)
Belgium	Dessel	MMN		200
France	FBFC	Franco-Belge de Fabrication de Combustibles	West. 16%	200
France	SICN	SICN		50
France	SICREL	SICREL		N.A.
France	Eurofuel	Eurofuel	West. 40%	N.A.
France	Romans	CERCA	Sylvania 22%	80
FRG	RBU	Reaktor Brennelemente Union	General Elec. 20%	550
FRG		Alkem		45
FRG		BBR	Babcock & Wilcox 74%	N.A.
FRG		Nuklear Brennstoff	Westinghouse 40%	N.A.
FRG		KRT		220
Italy	Bosco Marengo	Fabricazoni Nucleari	General Elec. 45%	200
Italy	Saluggia	Coren	Westinghouse 51%	60
Italy	LFCEC	Wenese	Westinghouse	20
Japan	Yokosuka	JNF		560
Japan	Tokai Mura	Nuclear Fuel Industries		40

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[1] Excludes Communist Bloc Countries.

Country	Plant	Owner	U.S. Equity Participation	Capacity (Tons UO$_2$ Year)
Japan	Tokai	Mitsubishi		420
Netherlands	Interfuel	Interfuel		30
Sweden	Stockholm	ASEA Atom		50-100
Sweden	Vasteras	ASEA Atom		50-100
Sweden		ASEA Atom		350
U.K.	Springfields	BNFL		400
Spain		ENUSA		N.A.

AGREEMENTS FOR COOPERATION IN THE CIVIL USES OF ATOMIC ENERGY

A. BILATERALS WITH INDIVIDUAL COUNTRIES

Country:	Scope	Effective Date	Termination Date
Argentina	Research and power	July 25, 1969	July 24, 1999
Australia	do	May 28, 1957	May 27, 1997
Austria	do	Jan. 24, 1970	Jan. 23, 2014
Brazil	do	Sept. 20, 1972	Sept. 19, 2002
Canada	do	July 21, 1955	July 13, 1980
China, Republic of	do	June 22, 1972	June 21, 2014
Colombia	Research	Mar. 29, 1963	Mar. 28, 1977
Finland	Research and power	July 7, 1970	July 6, 2000
Greece[1]	Research	Aug. 4, 1955	Aug. 3, 1974
India	Power (Tarapur)	Oct. 25, 1963	Oct. 24, 1993
Indonesia	Research	Sept. 21, 1960	Sept. 20, 1980
Iran	do	Apr. 27, 1957	Apr. 26, 1979
Ireland	do	July 9, 1958	July 8, 1978
Israel	do	July 12, 1955	Apr. 11, 1977
Italy	Research and power	Apr. 15, 1958	Apr. 14, 1978
Japan	do	July 10, 1968	July 9, 2003
Korea	do	Mar. 19, 1973	Mar. 18, 2014
Norway	do	June 8, 1967	June 7, 1997
Philippines	do	July 19, 1968	July 18, 1998
Portugal	do	June 26, 1974	June 25, 2014
South Africa	do	Aug. 22, 1957	Aug. 27, 2007
Spain	do	June 28, 1974	June 27, 2014
Sweden	do	Sept. 15, 1966	Sept. 14, 1996
Switzerland	do	Aug. 8, 1966	Aug. 7, 1996
Thailand	do	June 27, 1974	June 26, 2014
Turkey	Research	June 10, 1955	June 9, 1981
United Kingdom	Research and power	July 21, 1955	July 20, 1976
Do	Power	July 15, 1966	July 14, 1976
Venezuela	Research and power	Feb. 9, 1960	Feb. 8, 1980
Vietnam, Republic of	Research	July 1, 1959	June 30, 1979

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[1] Superseding research and power agreement in abeyance; U.S. material covered by IAEA (NPT) safeguards.

AGREEMENTS FOR COOPERATION IN THE CIVIL USES OF ATOMIC ENERGY

B. BILATERALS WITH INTERNATIONAL ORGANIZATIONS

Organization:

European atomic energy community (EURATOM)	Joint nuclear power program	Feb. 18, 1959	Dec. 31, 1985
EURATOM	Additional agreement to joint nuclear power program	July 25, 1960	Dec. 31, 1995
International Atomic Energy Agency (IAEA)	Supply of materials, etc.	Aug. 7, 1959	Aug. 6, 2014

INTERNATIONAL AGREEMENTS

Special arrangements:

United States-U.S.S.R.	Agreement on scientific and technical cooperation for the peaceful uses of atomic energy.	June 21, 1973	June 20, 1983
United States - Romania	Memorandum on cooperation in peaceful uses of atomic energy.	Jan 1, 1973	[2/]

[2/] Remains in effect until representatives of the USERDA and Government of Romania have the opportunity to discuss a renewal of the memoranda.

UNITED STATES-IAEA TRILATERAL SAFEGUARDS AGREEMENTS FOR APPLICATION OF IAEA SAFEGUARDS TO U.S.-SUPPLIED MATERIALS

3d Party	Effective Date	Termination Date[1]
Argentina	July 25, 1969	AC
Australia (suspended July 10, 1974)[2]	Sept.26, 1966	AC
Austria (suspended July 23, 1972)[1]	Jan. 24, 1970	AC
Brazil (amended Sept. 20, 1972)	Oct. 31, 1968	AC
China, Republic of	Dec. 6, 1971	AC
Colombia	Dec. 9, 1970	AC
Denmark (suspended Mar. 1, 1972)[1]	Feb. 29, 1968	AC
India	Jan. 27, 1971	AC
Indonesia	Dec. 6, 1967	AC
Iran (suspended May 15, 1974)[1]	Aug. 20, 1969	AC
Israel	June 15, 1966	April 4, 1975
Japan	July 10, 1968	AC
Korea (amended Mar. 19, 1973)	Jan. 5, 1968	AC
Philippines (suspended Oct. 16, 1974)[2]	July 19, 1968	AC
Portugal	July 19, 1969	AC
South Africa (amended June 28, 1974)	July 26, 1967	AC
Spain (amended June 28, 1974)	Dec. 9, 1966	AC
Sweden	Mar. 1, 1972	AC
Switzerland	Feb. 28, 1972	AC
Turkey	June 5, 1969	AC
Venezuela	Mar. 27, 1968	AC

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[1] AC indicates termination on same date as agreement for cooperation

[2] Suspended in view of NPT safeguards agreement with IAEA

NON-PROLIFERATION TREATY AND SAFEGUARDS STATUS OF COUNTRIES WITH WHICH THE UNITED STATES HAS AGREEMENTS FOR COOPERATION

Country	NPT Status	Safeguards
Argentina		IAEA Trilateral
Australia	Ratified	IAEA-NPT
Austria	do	Do
Brazil		IAEA Trilateral
Canada	Ratified	IAEA-NPT
China, Republic of[1]	do	IAEA Trilateral
Colombia	Signed, but not ratified	Do
Denmark	Ratified	IAEA-NPT
Finland	do	Do
Greece	do	Do
India		IAEA Trilateral
Indonesia	Signed, but not ratified	Do
Ireland	Ratified	IAEA-NPT
Iran	do	Do
Israel		IAEA Trilateral
Japan	Signed, but not ratified	Do
Korea	Ratified	Do
Norway	do	IAEA-NPT
Philippines	do	Do
Portugal		IAEA Trilateral
South Africa		Do
Spain		Do
Sweden[2]	Ratified	Do
Switzerland	Signed, but not ratified	Do
Thailand	Ratified	IAEA-NPT
Turkey	Signed, but not ratified	IAEA Trilateral
Venezuela	do	Do
Viet Nam	Ratified	IAEA-NPT
United Kingdom[3]		

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[1] An NPT safeguards agreement has not been concluded between the IAEA and ROC as a result of the ROC's explusion from the IAEA in December 1971. The IAEA Trilateral Safeguards Agreement, however, is still in effect and being implemented.

[2] Negotiation of an NPT safeguards agreement is underway with the IAEA

[3] The United States/United Kingdom agreement for Cooperation in the power reactor field envisages the application of IAEA safeguards on any enriched fuel provided by the United States. No such material has been provided to date.

NON-PROLIFERATION TREATY AND SAFEGUARDS STATUS OF COUNTRIES WITH WHICH THE UNITED STATES HAS AGREEMENTS FOR COOPERATION

NOTE: In addition to the above, the Euratom states (Belgium, Federal Republic of Germany, Italy, Luxembourg, and the Netherlands) are in the process of ratifying the NPT, following which the IAEA/Euratom safeguards agreement will come into force. In the meantime, Euratom safeguards apply. France, which is not an NPT party, will continue to be subject to Euratom safeguards insofar as United States-supplied materials and equipment are concerned.

Responses to Senator Ribicoff's Questions

Question 1. Last week, Dr. David Rosenbaum provided details of an alleged incident in which nuclear officials in India confiscated the tape of a plutonium-measuring device used by an IAEA inspector. This allegedly took place before India detonated its peaceful nuclear explosion last year.

(a) What information do you have on this alleged incident? When was this information first received, and was it relayed by the IAEA?

(b) If India refused to allow IAEA to take independent measurements of plutonium generated by its imported reactors, what action did the IAEA take against India?

(c) Under the circumstances, how can ERDA justify continued nuclear exports to India, a non-NPT nation?

(d) What advance knowledge did we have of India's plans to detonate a "peaceful nuclear explosive?"

Answer
1. a & b We were aware of Dr. Rosenbaum's report of the alleged incident last June or July. However, the facts of the situation do not support the contention (a) that the tape was confiscated, (b) that the device in question was a plutonium measuring

device, or (c) that the data on the tape was safeguards inspection data. The facts, which were obtained from the IAEA, are as follows:

Some of the individual rods in the Tarapur reactor fuel assemblies in the core were leaking. The Indian authorities wished to take low burn-up rods from already discharged assemblies to put in place of the leaking rods in the fuel assemblies in the core. However, they did not have a way of verifying which rods had least burn-up. The IAEA became aware of this problem and advised the Indian authorities that they were developing an instrument for possible safeguards application which could measure burn-up in rods, but that they did not have access to actual irradiated fuel rods. The IAEA worked out a mutually beneficial arrangement with India whereby an IAEA instrument specialist, designated as an ad-hoc inspector, went along on a routine IAEA inspection in January 1974 to do developmental work with the instrument and, at the same time, to identify the low burn-up rods the Indian authorities were looking for. The instrument readout is a real-time display on a cathode ray tube. In order to have the ability to replay this data for further evaluation and review on-site, the information was recorded on a magnetic tape cassette. Successful evaluation of the data was performed on-site by the IAEA and Indian authorities. According to arrangements between the IAEA and India which were made prior to the experiment, the tape is kept on file at the reactor site and is available for additional review by Agency inspectors or facility personnel at any time.

Thus, India did not violate any of its safeguards commitments and the episode in question was an experimental exercise which benefitted both the IAEA in testing its developmental techniques and India in locating its low burn-up rods. Both the IAEA and India agreed in advance that the magnetic tape cassette would remain at the reactor.

1.c The Agreement for Cooperation between India and the US is limited to cooperative activities associated with the Tarapur Atomic Power Station. Nuclear exports under this Agreement are therefore limited to this civil application of nuclear energy and are subject to IAEA safeguards. The Agreement for Cooperation provides that the Tarapur reactors will only be fueled with US supplied nuclear material. The uranium fuel supplied for the Tarapur is low enriched uranium which cannot itself be used for a nuclear explosive. The Agreement further provides that the irradiated Tarapur reactor fuel (which contains plutonium) may be reprocessed in Indian facilities upon a joint determination that safeguards may be effectively applied, or in other mutually acceptable facilities. Following our request, the Government of India has recently assured the Government of the United States that it shares our understanding that, under the agreement, the nuclear material that has been or will be made available or used, or produced in the Tarapur Atomic Power Station will be devoted exclusively to the needs of that station unless the two governments specifically agree that such material be used for other purposes. This understanding would permit the United States, consistent with its national policy, to veto the use of the material in or for a nuclear explosive device. India understands this U.S. policy. In addition, IAEA safeguards are applied at Tarapur and we have no reason to believe that India has violated its safeguard agreements. In view of all these considerations, we believe the continued supply of special nuclear material for use in the Tarapur project to be consistent with our Agreement for Cooperation, our commitments under the NPT, and the peaceful application of atomic energy for civil purposes. Refusal to supply such material, in the absence of evidence of Indian non-compliance with its commitments, would in effect constitute an abrogation of the obligations the US has undertaken in the Agreement with India.

1.d The United States was aware of India's interest in,and its capability for developing,nuclear explosive devices. Indian officals had indicated on a number of occasions that India was studying the usefulness of nuclear explosives. However, at no time did India reveal that it was actually developing nuclear explosives or that it had plans to detonate a device in May, 1974.

The United States has made it clear on a number of occasions that it considers the technology for making peaceful nuclear explosive devices to be indistinguishable from the technology of making nuclear weapons. On March 1, 1972 the US Representative to the IAEA Board of Governors placed on the record the understanding that the use of any material or equipment supplied by the United States was precluded under our bilateral agreements for cooperation; and the understanding inherent in the safeguards agreements related to such cooperation agreements that the IAEA would verify, inter alia, that safeguarded material was not used for any nuclear explosive device.

Question 2 Article 8f of the U.S. Agreement for Cooperation with South Africa states that the highly enriched uranium we are supplying South Africa for its research reactor shall at no time be in excess of the quantity needed to load the reactor, plus an additional quantity which both nations agree "is necessary for the efficient and continuous operation" of the reactor.

Data supplied by ERDA last week shows that even though South Africa's Safari I research reactor requires only 30 pounds of highly enriched uranium for refueling each year, our exports have resulted in an inventory of nearly 100 pounds. That leaves a surplus of about 70 pounds, or enough for about 5 nuclear weapons. Furthermore, an additional 56 pounds is on order from the U.S., and yet another 56-pound order is anticipated, for a total of 112 pounds, or enough for 8 more nuclear weapons.

(a) How does ERDA justify these large amounts of surplus weapons-grade uranium as being "necessary for the efficient and continuous operation" of South Africa's research reactor?

(b) Haven't we provided South Africa with a ready supply of weapons materials, should it decide some day that it needs to use it for military purposes?

(c) Which agencies have participated in the decisions on how much enriched uranium to export to South Africa over the years?

Answer 2.a Operation of the Safari reactor requires a partial reload of fuel every three weeks and therefore requires an adequate working stock of fuel in order to assure an efficient and continuous operation, as provided for in the Agreement for Cooperation.

Over the last 10 years the U.S. has supplied a total of 199.4 pounds of highly enriched uranium* to South Africa for fueling the Safari-I research reactor. 75.5 pounds of this uranium has been returned and approximately 37 pounds has been burned up in the reactor; hence, the inventory remaining in South Africa is about 87 pounds of uranium. In March of this year, this inventory included approximately 41 pounds of enriched uranium contained in 130 irradiated fuel elements in the cooling pond. This irradiated fuel must remain in the cooling pond for a certain period of time where decay of short-lived fission products can be accommodated and the fuel cooled sufficiently before it can be shipped. The reactor itself requires about 30 pounds of enriched uranium per year for continuous operation. This leaves approximately

*It contains 180.2 pounds of the isotope U-235 or is approximately 90% enriched.

16 pounds of uranium fuel in reserve which is sufficient for about 6 months of reactor operation. With this type of reactor operating on a full schedule, it is normal practice to maintain a one-year's supply of fresh fuel at all times. The United States followed this practice on the Oak Ridge Research Reactor, the Materials Test Reactor and the Engineering Test Reactor. Thus the quantity of fabricated fuel on hand in South Africa is consistent with the assured and efficient supply of fabricated fuel and the continuous operation of this reactor.

Approximately 30 pounds of enriched uranium in the form of fabricated fuel is expected to be exported by mid 1975 under an existing license. NRC has also received a license application to export an additional 56 pounds of uranium in the form of fabricated fuel elements. (Fabrication will take place in the United States). These quantities are consistent with normal fuel fabrication practices since orders are placed well in advance and are generally contingent upon the export authorization. Orders are typically placed a year or more in advance of delivery to provide time for fabrication, shipment and licensing delays and to allow fabrication to be undertaken on a reasonable scale. The application for export of the 56 pounds of uranium will be given appropriate review.

Answer 2.b The highly enriched uranium being supplied to South Africa is shipped as fabricated fuel elements. The uranium in these fuel elements is contained in an aluminum/uranium alloy with more than 80 percent aluminum. The highly enriched uranium in this form is not directly useable in a nuclear explosive and would require chemical separation. As can be seen from the response to (a) above, most of the fuel provided to South Africa has already been utilized in the reactor, is therefore irradiated and hence is not available as "a ready supply of weapons material" without major chemical reprocessing. Such reprocessing for the South African fuel can only be performed in facilities acceptable both to South Africa and the United States upon a joint determination that safeguards may be effectively applied.

Any use of U.S.-supplied material for military purposes, (including use in any nuclear explosive device) would be a violation of our agreement for cooperation. It should also be noted that the South Africans have their own pilot uranium enrichment plant and have recently announced plans for the construction of a commercial scale facility.

Answer 2.c The quantities of enriched uranium authorized for supply to South Africa have been addressed in the Agreement for Cooperation concluded in 1957 and amended in 1962, 1967 and 1974. This agreement and the amendments were developed by the AEC and the Department of State, approved by the President and submitted to the Congress as required by Section 123 of the Atomic Energy Act. The amounts of uranium actually delivered pursuant to these agreements were agreed upon by the AEC based on the operational needs of the reactor.

Question 3. "What restrictions, if any, does a license to export 100,000 pounds of low-enriched uranium reactor fuel to South Korea place on reprocessing of the 1,500 pounds of plutonium that will be contained in the spent fuel?

(a) What is to prevent South Korea from importing a reprocessing plant from another exporting nation, like France, or arranging for reprocessing of its plutonium in a non-NPT country like South Africa?"

Answer If the 100,000 pounds of low-enriched fuel were to be used for the initial core of a 600 MWe reactor, the total quantity of plutonium produced would be on the order of 600 pounds over a period of 3 to 4 years and would be contained in highly irradiated fuel elements. If the 100,000 pounds were for three annual reloads, the plutonium produced would be on the order of 900 pounds over a period of three years and would also be contained in highly irradiated fuel elements.

The restriction governing reprocessing of U.S.-supplied enriched uranium to South Korea is established in the U.S.-Korean Agreement for Cooperation. The agreement provides that reprocessing shall take place in facilities "acceptable to the Parties", i.e., to the United States and South Korea. Nuclear material export licenses are issued pursuant to the agreement, and only after written assurance is received from the Government of Korea that all conditions of the agreement will be applicable. Thus the requirement with respect to reprocessing is fully applicable to the export license.

South Korea is now an NPT party and is committed not to manufacture or to otherwise acquire weapons or other nuclear explosive devices or to seek or receive assistance in the manufacture of nuclear weapons or other nuclear explosive devices. Moreover, its commitments under the NPT also require the application of safeguards on all source or special fissionable material in all peaceful nuclear activities within the territory of South Korea, under its jurisdiction, or carried out under its control anywhere.

Thus, as an NPT party, any reprocessing obtained by South Korea, regardless of its source, would have to be subject to safeguards, and any reprocessing of US supplied material would be subject to U.S. approval as indicated above.

There is nothing to prevent Korea from importing a reprocessing plant if it can find a willing exporter, or attempting eventually to construct its own facilities. The reprocessing of U.S.-supplied enriched uranium fuel from any Korean plant, however, would have to be in accordance with the requirements of the U.S.-Korean Agreement for Cooperation. In addition to the above noted condition in the agreement regarding reprocessing, US approval of retransfers of US-supplied material from Korea to other countries is required, and retransfer of plutonium produced in SNM supplied by the U.S. can occur only if the recipient has an agreement of cooperation with the U.S. or otherwise agrees to safeguards acceptable to the United States.

It should be noted also that parties to the NPT have undertaken not to supply to any non-nuclear weapon state equipment especially designed for the processing or production of SNM, unless the nuclear material will be subject to IAEA safeguards. France is not an NPT party, but it has announced that it will act as though it were.

Question 4. What safeguards arrangements to prevent theft will apply to a licensed export to West Germany of nearly 140 pounds of highly enriched uranium for fabrication into reactor fuel.

In what ways did the U.S. consider recent terrorist activities in West Germany and design special safeguards to deal with the potential threat?

Answer The United States has reviewed West German physical security arrangements to prevent theft of the 45.11 kg of highly enriched uranium scheduled for export to the Federal Republic of Germany for fabrication into reactor fuel. An ERDA Physical Security Review Team has met with FRG officials and visited facilities. The safeguard arrangements provide protection during transport, storage, fabrication and utilization and include a variety of physical security measures which provide a system of protection in depth. ERDA is the process of analyzing these arrangements, and only after the adequacy of safeguards provisions is determined, will a recommendation regarding the export be made.

During bilateral discussions held in this country and during a recent visit to FRG installations by an ERDA Physical Security Review Team, the U.S. and FRG have discussed the nature of potential threats, as well as appropriate physical security measures to cope with these threats.

Question 5 You state that the US has done more to establish a workable structure of international safeguards than any other nation. Why didn't we take advantage of the role we played for many years, as the free world's sole source of enriched uranium fuel, to influence other nations to establish a strict, uniform system of physical security safeguards?

(a) Why have we waited until now - as we are about to lose that monopoly - to seek the establishment of an international convention on physical security? Isn't this an example of "too little, too late"?

Answer The US has played the major role in the development of a workable structure for international safeguards. Since President Eisenhower initiated the Atoms for Peace Program, the US has pursued a safeguards program initially through the provisions of our bilateral Agreements for Cooperation and subsequently through the development of the IAEA safeguards program. The prime objective of these programs has been the deterrence and detection of diversion of nuclear materials to prevent the national proliferation of nuclear weapons.

Physical security, on the other hand, is fundamentally a national responsibility, and an essential part of each country's national safeguards system is physical protection. The US has for years worked with other countries in the development of national physical security systems to prevent the subnational theft and sabotage of nuclear materials and facilities. The US promoted and assisted in the development and publication of "Recommendations for the Physical Protection of Nuclear Material" which was issued under IAEA sponsorship in 1972. A review and updating of that publication has just been completed by a staff of experts from the US and other nations.

We are also discussing with others the possibility of establishing an international convention on physical security.

Physical security systems will necessarily vary from country to country depending upon the nature of the facilities, the nuclear materials involved, the nature of the threat, and the laws of the country.

In the past, physical security concerns on an international basis were not as great as they are today because of the limited quantities of highly enriched uranium and plutonium available in civil programs. Physical security measures were designed to provide the protection required by the nature of the potential threats. In recent years, greater emphasis has been given to physical security domestically and in other countries as a result of the increased availability and shipment of quantities of nuclear materials that could potentially be used in a nuclear explosive and as a result of the apparent upsurge in organized subnational terrorist activity.

The US has not found it necessary to use its leverage as the principal supplier of enriched uranium to influence other nations to establish adequate physical security systems, since we have found a worldwide awareness and interest in the need for effective physical security of nuclear materials.

Question 6. You describe Congress as a partner in developing nuclear export policy by approving or disapproving proposed executive agreements for cooperation with other nations.

Yet, these agreements are mostly pro-forma; the real export policy is made through the licenses for export of nuclear equipment and materials that are issued under these executive agreements.

(a) What role does Congress play in approving or disapproving these nuclear export licenses?

Answer The Atomic Energy Act of 1954, as amended, provides for a program of international cooperation on the peaceful applications of atomic energy under the conditions and requirements set forth therein. Fundamentally, the Act establishes the Agreement for Cooperation as the framework governing the implementation of such cooperation and, pursuant to the Act, the existence of such an agreement is a prerequisite before export of special nuclear material or reactors to the country concerned may be licensed.

Section 123 of the Act establishes the requirements for concluding the Agreements, which includes approval by the President and submission to the Congress. Pursuant to this section, the Agreements must include terms, conditions, duration, nature, scope of cooperation, a guaranty by the cooperating party that security safeguards and standards as set forth in the agreement for cooperation will be maintained and, except for military agreements, a guaranty that any material to be transferred pursuant to the agreement will not be used for atomic weapons, or for research on or development of atomic weapons or for any other military purpose.

Each specific export transaction may take place only if provided for in the US or IAEA Agreement for Cooperation. For example, an export of highly enriched uranium may only take place if the Agreement provides for transfer of such material and if the standard requirement for specific U.S. approval (established in the Agreements) has been satisfied. Further, an export of a power reactor may only take place if the pertinent Agreement provides for cooperation in power applications of atomic energy. Additionally, an export of special nuclear material may take place only for a purpose authorized, and within guaranties, provided in the Agreement.

Each application for export is reviewed on a case-by-case basis to determine whether or not it is in accord with the existing Agreement for Cooperation and with existing U.S. policies and to determine that the proposed export would not be inimical to the common defense and security of the United States. Further, written assurances are obtained from the Government concerned that the export will be accepted under all terms and conditions of the Agreement and that the consignee is authorized to receive and possess the material proposed for export.

Thus, while the Congress does not become directly involved in the approval or disapproval of a specific nuclear export license applicatio it does have a major role, through its approval of Agreements of Cooperation, in establishing the policy framework governing the issuance of export licenses to each individual country including the nature and adequacy of safeguards.

Question 7 Last week, General Giller testified that ERDA had no problem discussing with other nations the need for improved physical security over nuclear materials and facilities. He mentioned that nine countries sent representatives here for such discussions. Please name the nine countries?

(a) Which countries have we found to be uncooperative on the subject of physical security

(b) Has the United States taken any corrective steps with respect to our exports to these uncooperative countries?

Answer The U.S. initially invited Canada, the Federal Republic of Germany, the United Kingdom, France, Israel, the Netherlands, Japan, Euratom and Egypt to participate in bilateral discussions concerning physical security of nuclear materials and facilities. Others have subsequently been invited. To date, discussions have been held with Canada, the Federal Republic of Germany, the United Kingdom, France, Israel, the Netherlands and Euratom. In addition, Japan, Sweden and Italy have accepted invitations and discussions with these countries are scheduled for the near future. We have found no country to be uncooperative in this matter. On the contrary, we have observed a genuine and active interest in all countries which we have contacted.

Question 8. How can we be sure that international safeguards are acceptable to the U.S. in view of the fact that specific safeguards arrangements with respect to U.S.—exported nuclear equipment and materials are negotiated in *secret* by the IAEA and the recipient country? How can we be sure such safeguards are acceptable when apparent violations are not reported directly to us by the IAEA?

Answer The United States has a detailed knowledge of and has given its approval of the IAEA safeguards system. The safeguards arrangements negotiated between the IAEA and specific countries go into technical details about the operations of the safeguarded facilities which may be of proprietary interest to the country. Such information is protected by the IAEA Statute and by the Safeguards Agreements themselves. The U.S. has supported the inclusion of this right to have proprietary information kept confidential as being a necessary feature of an effective international safeguards program in order to assure all countries that the IAEA will not be used as a vehicle for supplying proprietary information to competitors. A sample copy of an IAEA Safeguards Design Information Questionnaire is attached, which demonstrates the kind of details necessary for safeguards planning. (You will note that this questionnaire is handled as confidential by the Agency once the information is filled in.)

Nevertheless, the U.S. does have information about the technical operation of IAEA safeguards. The U.S. has participated extensively in the development of the IAEA's safeguards system and continues to be broadly involved in technical meetings dealing with all aspects of the program. For example, in 1975 at least 17 U.S. experts in various areas of safeguards systems and technology will have participated in safeguards consultants and advisory meetings with IAEA staff members on subjects ranging from instrumentation, to ADP application, review of the Agency's Safeguards Technical Manual, and safeguards statistical techniques. A more detailed report of this U.S. participation is being submitted as backup to my April 30 testimony. In addition, the U.S. Mission to the IAEA in Vienna is in almost daily contact with the Agency on safeguards matters. Finally, of the current 72 professional safeguards staff members in the IAEA, 9 are from the U.S. These individuals have lengthy experience and excellent qualifications in the safeguards area which they bring to bear in the development and application of IAEA safeguards.

With this background, the U.S. is familiar with the technical features of IAEA safeguards, including the instruments, techniques and procedures available to IAEA inspectors. The U.S. is also aware, through published reports, of the general level of effort the Agency applies to safeguards, e.g., manpower, budget, number of annual inspections, number and type of inspected facilities, quantity and kind of safeguarded material, etc. In addition, the Agency provides us with annual reports of the specific quantities of nuclear material subject to Agency safeguards pursuant to certain of our trilateral safeguards Agreements.

The release of additional information is an area of policy which is under continual examination and development in order to assure that safeguards techniques are being applied effectively.

Finally, even though the IAEA does not reveal the details of its safeguards agreements, it does have an obligation to report serious incidents of non-compliance with any safeguards agreement to its Board of Governors, of which the U.S. is a member. If the IAEA is unable to verify that safeguarded material has not been diverted, the agency may request the State to take certain actions to permit verification within a reasonable time, or the IAEA Board may initiate non-compliance procedures. These procedures include notification to member states of the IAEA as well as the UN Security Council and General Assembly. Thus the United States, as a Board member, would receive early information of apparent violations and would participate in any Board determination of non-compliance and decisions regarding actions to be taken.

Question 9. "Do agreements with non-NPT nations like India and South Africa specifically ban peaceful nuclear explosions? How do we distinguish between a peaceful nuclear explosion and one for weapons purposes?

Answer The U.S. Agreements for Cooperation with India and South Africa, like those with other countries, ban the use of U.S.-supplied material and equipment for development of nuclear weapons or any other military purpose. The technology of making nuclear weapons and peaceful nuclear explosive devices (PNE's) is indistinguishable; thus, it is the position of the United States that PNE's are banned under the agreements. In recent years, the United States has made a point of officially informing cooperating countries in this regard. For example, the U.S. issued a formal statement in 1972 before the IAEA Board of Governors. In addition, Ambassador Tape made a similar statement reiterating the US position at the meeting of the IAEA Board of Governors in June 1974. Such statements are part of the official Agency record. Moreover, to assure that there can be no misunderstanding, we have begun to reaffirm formally in the Agreements for Cooperation the understanding of the parties that U.S. material may not be used for PNE's.

CONFIDENTIAL
(only when filled in)

INTERNATIONAL ATOMIC ENERGY AGENCY
DEPARTMENT OF SAFEGUARDS AND INSPECTION

DESIGN INFORMATION QUESTIONNAIRE

The purpose of this document is to obtain the facility design information required by the Agency in order to discharge its safeguards responsibilities. It will also serve as a check list for examination of design information by Agency inspector(s). If, in any area, insufficient space is available add further sheets to the extent necessary.

IAEA USE ONLY	
COUNTRY	
COUNTRY OFFICER	
TYPE	
DATE OF INITIAL DATA	
VERIFICATION	
LAST REVIEW AND UPDATING	

GENERAL INFORMATION

1. NAME OF THE FACILITY (incl. usual abbreviation)			
2. LOCATION AND POSTAL ADDRESS			
3. OWNER (legally responsible)			
4. OPERATOR (legally responsible)			
5. DESCRIPTION (main features only)			
6. PURPOSE			
7. STATUS (planned; under construction; in operation)			
8. CONSTRUCTION SCHEDULE DATES (if not in operation)	Start of Construction	Commissioning	Operation
9. NORMAL OPERATING MODE (days only, two-shift, three shift; number of days/annum, etc.)			
10. FACILITY LAYOUT (structural containment, fences, access, nuclear material storage areas, laboratories, waste disposal areas, routes followed by nuclear material, experimental and test areas, etc.)	DRAWING(S) ATTACHED UNDER REF. Nos.		
11. SITE LAYOUT (site plan showing in sufficient detail; location, premises and perimeter of facility, other buildings, roads, railways, rivers, etc.)	DRAWING(S) AND/OR MAPS ATTACHED UNDER REF. Nos.		
12. NAMES AND/OR TITLE AND ADDRESS OF RESPONSIBLE OFFICERS (for nuclear material accountancy and control and contact with the Agency. If possible attach organization charts showing position of officers)			

OVERALL PROCESS PARAMETERS

13. FACILITY DESCRIPTION (indicating all process stages, storage areas and feed, product and waste points)	GENERAL FLOW DIAGRAM(S) ATTACHED UNDER REF. Nos.
14. PROCESS DESCRIPTION (identifying sampling and key measurement points; MBAs; inventory locations)	FLOWSHEET(S) FOR NORMAL OPERATION ATTACHED UNDER REF. Nos
15. DESIGN CAPACITY (in weight of principle products per annum)	
16. ANTICIPATED THROUGHPUT (in the form of a forward programme indicating the proportion of various feeds and products)	

NUCLEAR MATERIAL DESCRIPTION AND FLOW

17. MAIN MATERIAL DESCRIPTION	FEED	PRODUCT (1)	
i) Chemical and Physical Form (for feed, include types of fuel element/assemblies)			
ii) Throughput, Enrichment Ranges and Pu contents (for normal flowsheet operation indicating if blending and/or recycling takes place)			
iii) Batch Size/Flow Rate and Campaign Period			
iv) Storage Inventory (indicating any change with throughput)			
v) Frequency of Receipt or Shipment			

NUCLEAR MATERIAL DESCRIPTION AND FLOW	
18. WASTE MATERIAL i) Source and Form (indicating major contributors, liquid or solid; range of constituents, enrichment range and Pu content; include contaminated equipment) ii) Storage Inventory Range, Method and Frequency of Recovery/Disposal	
19. CONTAINERS, PACKAGING AND STORAGE AREA DESCRIPTIONS	SEPARATE NOTE TO BE ATTACHED describing for feeds, products and wastes the size and type of containers and packaging used; method of storage including fuel element locations, handling equipment and its capabilities; any special identification features.
20. RECYCLE PROCESSES (briefly describe any such processes giving source and form of material, method of storage, normal inventory, frequency of processing)	
21. MEASURED DISCARDS AND RETAINED WASTE i) As % of input;	

NUCLEAR MATERIAL DESCRIPTION AND FLOW

22. INVENTORY i) In-Process (within plant and equipment during normal operation; indicate quantity, form and main locations and any significant change with time or throughput) ii) Other locations (quality, form and location of inventory not already specified)	

PLANT MAINTENANCE

23. MAINTENANCE, DECONTAMINATION, CLEAN-OUT	SEPARATE NOTE TO BE ATTACHED describing plans and procedures and defining all sampling and key measurement points associated with: i) normal plant maintenance; ii) plant and equipment decontamination and subsequent nuclear material recovery; iii) plant and equipment clean-out including means of ensuring vessels are empty.

PROTECTION AND SAFETY MEASURES

24. BASIC MEASURES FOR PHYSICAL PROTECTION OF NUCLEAR MATERIAL	
25. SPECIFIC HEALTH AND SAFETY RULES FOR INSPECTOR COMPLIANCE (if extensive, attach separately)	

NUCLEAR MATERIAL ACCOUNTANCY

26. SYSTEM DESCRIPTION Give a description of the nuclear material accountancy system, the method of recording and reporting accountancy data and establishing material balances, frequency of material balances, procedures for account adjustment after plant inventory, mistakes, etc. under the following headings: i) General	SPECIMEN FORMS USED IN ALL PROCEDURES ATTACHED UNDER REF. Nos.

NUCLEAR MATERIAL ACCOUNTANCY

SYSTEM DESCRIPTION CONTINUED ii) Receipts (including method of dealing with shipper/receiver differences and subsequent account corrections)	
iii) Shipments (product and waste)	

NUCLEAR MATERIAL ACCOUNTANCY

SYSTEM DESCRIPTION CONTINUED iv) Physical Inventory (frequency, procedures, estimated distribution)	LIST OF MAJOR ITEMS OF EQUIPMENT REGARDED AS NUCLEAR MATERIAL CONTAINERS ATTACHED UNDER REF. Nos.
v) Measured Discards and Retained Waste	
vi) Operational Records and Accounts (including method of adjustment or correction and place of preservation and language)	

NUCLEAR MATERIAL ACCOUNTANCY	
27. FOR EACH KEY MEASUREMENT POINT IDENTIFIED UNDER Qs. 14 AND 23 GIVE THE FOLLOWING: i) Identification	
ii) Chemical and Physical Form of Material	
iii) Sampling Procedure and Equipment Used	
iv) Measurement/Analytical Method and Equipment Used	
v) Source and Level of Random and Systematic Errors (weighing, volume, sampling, analytical)	
vi) Method of Converting Source Data to Batch Data (standard calculative procedures, constants used, emperical relationships, etc.)	

NUCLEAR MATERIAL ACCOUNTANCY	
vii) Calculative and Error Propagation Technique	
viii) Technique and Frequency of Calibration of Equipment Used	
ix) Programme for the Continuing Appraisal of the Accuracy of Weight, Volume, Sampling and Analytical Techniques and Measurement Methods	
x) Programme for Statistical Evaluation of Data from (viii) and (ix).	

NUCLEAR MATERIAL ACCOUNTANCY	
28. OVERALL LIMIT OF ERROR Describe procedure to combine individual measurement error measurements to obtain the overall limit of error for: i) S/R Differences ii) Book Inventory iii) Physical Inventory iv) MUF	
OPTIONAL INFORMATION	
29. OPTIONAL INFORMATION (that the operator considers relevant to safeguarding the facility)	

STATEMENT OF JOHN K. TABOR
ACTING SECRETARY OF COMMERCE
BEFORE THE SENATE COMMITTEE
ON GOVERNMENT OPERATIONS
ON APRIL 30, 1975

I welcome this opportunity to appear before you today to discuss the Department's role with respect to exports of nuclear facilities, materials and technology for peaceful purposes, and to comment on S.1439, the Export Reorganization Act of 1975.

There are obvious economic benefits to be derived from exporting nuclear facilities, materials and technology for peaceful purposes. Sales abroad have made and can continue to make a significant contribution to our national effort to develop a favorable balance of payments. On the other hand, there is the justifiable concern with the possibility that these exports will lead to the proliferation of nuclear explosives, unless effective safeguards are devised and faithfully applied. As is the case with so many of our national issues, a judicious balance must be struck between these two basic considerations.

The risks of proliferation of nuclear explosives and the development of effective safeguards to prevent it are matters that are properly the concern and statutory responsibility of other agencies. Accordingly, I propose, when commenting on S.1439, to limit myself to treating only with Sections 4 and 11 which provide for transferring to the Secretary of Commerce certain functions currently being performed by other departments or agencies. I shall deal principally with the Department's role with respect to various aspects of the Nation's program for exporting nuclear facilities, materials, and technology for peaceful purposes, since the Committee's invitation focused on this.

In the nuclear field, as you know, the Nuclear Regulatory Commission (NRC), the Energy Research and Development Administration (ERDA) and the Office of Munitions Control (OMC) in the Department of State have primary export licensing jurisdiction. The Department of Commerce performs a supportive role.

Our supportive role may be more clearly understood if I were first to summarize the controls exercised by the other agencies.

NUCLEAR AGENCIES

The two agencies that were formed from the Atomic Energy Commission (the Nuclear Regulatory Agency and the Energy Research and Development Administration) now license between them exports of nuclear technology and all "special nuclear materials" (uranium 235, uranium 233, plutonium), "source materials" (normal and depleted uranium and thorium), "by-product materials" (radioactive isotopes produced in a nuclear reactor); "utilization facilities"(nuclear reactors) when the components to be exported constituted a complete or substantially complete reactor; "production facilities" (isotopic separation plants) and any component part thereof that is specially designed for use therein.

In short, these agencies license the items that are most critical to the supply of nuclear energy, whether for power or for nuclear weapons and explosive devices.

DEPARTMENT OF STATE

The Department of State, as reflected by its Munitions List, licenses exports of goods and technology specially designed for the design, development, fabrication and testing of nuclear weapons; naval nuclear propulsion plants and technology; and other military-oriented nuclear-related goods and technology. (Nuclear weapons are the responsibility of the Energy Research and Development Administration and the Department of Defense.)

DEPARTMENT OF COMMERCE

The Department of Commerce licenses exports of all other nuclear and nuclear-related commodities and technology to complement the primary controls of the two nuclear agencies and the Department of State. These items generally fall into four categories:

a. Radioactive isotopes other than those produced in nuclear reactors.

b. Components of nuclear reactors. Although these may be important and specially designed components, these are licensed by the Department of Commerce if they constitute substantially less than a complete reactor.

c. Maritime (civil) nuclear propulsion equipment and technology.

d. Multi-purpose items that can be used in connection with the design, development, fabrication or testing of nuclear weapons or nuclear explosive devices but are also used in nuclear research and industrial applications predominantly of a non-military application. Examples of these are certain pumps and compressors, certain computers, neutron generators, high speed cameras, porous nickel and the like.

Some 100 items on the Department's Commodity Control List were identified by the Atomic Energy Commission as being of special interest to it, and, during its existence, the Atomic Energy Commission was consulted before a licensing decision was made on an application to export these commodities. This procedure is continuing through a liaison office in the Energy Research and Development Administration. In no case does Commerce license such items without the concurrence of this liaison office.

Applications for exports of maritime nuclear propulsion equipment and technology are also cleared with the Departments of Defense and State before the Department of Commerce issues an export license. Beyond this, certain transactions involving multi-purpose commodities may, selectively, also be referred to the Department of State either by the ERDA liaison office or by the Department of Commerce for advice and concurrence prior to licensing if they involve the national nuclear non-proliferation policy. Moreover, for any export license application over which there is any disagreement or question as to the appropriate licensing decision, the transaction is subjected to formal interagency review by the Operating Committee of the Advisory Committee on Export Policy. Permanent members of the Operating Committee include the Department of State, the Department of Defense and the Energy Research and Development Administration. Finally, proposed exports to the Communist nations of any nuclear-related commodities under the Department of Commerce's jurisdiction are referred to the Operating Committee for review and advice under the more stringent policy applicable to these destinations.

S.1439

Let me turn now to the provisions of Sections 4 and 11 of S.1439, that would consolidate, within the Department of Commerce, the export control licensing functions now performed by the Departments of State and Treasury, the Nuclear Regulatory Commission and the Energy Research and Development Administration.

The proposal does not effect a complete consolidation of all the Government's export control authority; certain responsibilities currently lodged outside the Department are unaffected and would remain where they are. These are, however, modest in scope. Under S.1439 the significant control functions of other agencies would be merged with those exercised by Commerce.

There are both advantages and disadvantages in the consolidation proposed by S.1439. As the sponsors of the bill have noted, putting all significant export controls in one agency would promote the coordination of policy and administration of controls. Consolidation would also simplify matters for those business interests affected by controls. Instead of a multiplicity of agencies with unclear jurisdictional lines, there would be essentially one authority to which commercial interests could turn for licenses or guidance.

Consolidation would permit codification of regulations in one publication and would achieve economies and heighten efficiency by eliminating some duplication in the application of control resources. Lastly, Congress could look to one agency for accountability in the administration of the various laws providing for the control of exports.

On the other hand, there are significant disadvantages to consolidation as proposed by S.1439 that must be recognized.

The Secretary of Commerce is made responsible for the administration of the consolidated controls. Yet before the Department may issue a license for the export of any commodity or technology transferred to Commerce, the written approval of the agency formerly having jurisdiction must be obtained. In short, the authority of the Department is not commensurate with its responsibility.

RESPONSIBILITY BUT NOT COMMENSURATE AUTHORITY.

This same need to secure the written approval of other agencies will produce delays in processing applications, since the net effect of consolidation will be the introduction of another agency, Commerce, into the application processing cycle. The advantage of simplification accruing to commercial interests would be reduced, if not eliminated, by these delays in processing.

In many respects the consolidation proposed by S.1439 would also present unusual administration problems. Control over exports would be exercised under four different statutes, each with its peculiar policy thrust and procedural requirements. Moreover, in the compliance and enforcement area, there are different authorities and sanctions provided by the various statutes.

On balance, I believe that the disadvantages of consolidation as proposed outweigh the advantages. The most prominent advantage, enhanced coordination of control policy and administration, particularly in the nuclear area, can be achieved through other devices. For this reason the Department opposes the enactment of Sections 4 and 11 of S.1439.

In view of the little time afforded us before this Hearing, I am unable to comment on whether the Bill in its present form contains substantive and technical defects which, if retained, would give us serious administrative difficulties. It is our understanding that the Committee intends to hold further hearings on S.1439 and that we would have the opportunity to make further comments to the Committee at that time.

This concludes my prepared statement. I shall be pleased to answer any questions.

THE UNDER SECRETARY OF COMMERCE
Washington, D.C. 20230

Honorable Abraham Ribicoff
Chairman, Committee on Government
 Operations
United States Senate
Washington, D.C. 20510

Dear Mr. Chairman:

This is in response to your letter of May 5, 1975, in which you request answers to several questions about export licensing of nuclear reactor parts, for insertion in the record of the hearings of the Committee on Government Operations. For the sake of clarity, I shall answer your questions in the order you raised them.

Q. How did the Commerce Department come to license component parts of nuclear facilities, inasmuch as this authority is vested in the Nuclear Regulatory Commission under Section 109 of the Atomic Energy Act?

A. The Commerce Department does not license exports of parts and components for nuclear production facilities, such as uranium isotopic separation facilities and plants for the reprocessing of irradiated nuclear reactor fuel elements. Exports of such parts and components are licensed by the Energy Research and Development Administration (ERDA) under Section 57(b) of the Atomic Energy Act. The Commerce Department does, however, license exports of parts, components and accessories specially designed for nuclear utilization facilities, that is, nuclear reactors. (Commerce also licenses various commodities that have significant applications in conjunction with nuclear reactors but are not caught by Section 109 of the Atomic Energy Act.)

The Department began licensing components of nuclear reactors in 1963, following agreement among the fifteen nations who are members of the international strategic control organization (COCOM) that exports of major components of nuclear reactors to the Sino-Soviet bloc should be embargoed. At that time, the Department indicated to the Atomic Energy Commission (AEC) that we wished to implement this embargo by requiring specific validated licenses to export such components to all destinations in order to guard against transshipments through non-COCOM countries. The AEC agreed to our undertaking this licensing function. This Department continues to handle applications for licenses to export reactor components, consulting ERDA, formerly AEC, for policy direction in each case.

Q. Why does the Commerce Department consult with ERDA rather than NRC in the issuance of such licenses? Doesn't this arrangement circumvent the NRC's regulatory authority over exports?

A. The NRC staff has communicated informally with Commerce's export licensing authorities about the licensing of nuclear reactor parts, but these contacts to date have been chiefly of an information-gathering nature. Although the NRC is aware of the licensing function performed by this Department, it has not yet requested us to consult with NRC nor to transfer licensing responsibilities to the Commission.

You will note from the testimony of NRC's Chairman, Mr. William Anders, before the Committee on April 30 that the Commission is devising new procedures for working with the Executive Branch in connection with licensing exports of nuclear facilities or nuclear material. Although I assume that the new procedures will relate also to nuclear reactor parts, I am soliciting Mr. Anders' views and asking to be advised of the Commission's wishes with respect to the control and/or clearance procedures to be followed by Commerce.

I hope that this information will be helpful to you. Please do not hesitate to let me know if there is additional information you would like from this Department.

Sincerely,

John K. Tabor

Senator GLENN. Our next witness is Dr. Gerald F. Tape, U.S. Representative to the International Atomic Energy Agency. Dr. Tape is certainly not to be considered the least by being last, because he is the U.S. Representative to that agency, which has been referred to here repeatedly this morning. Dr. Tape, we certainly welcome you here, and I am sorry the time has gotten away from us. I appreciate your being here. Do you have a prepared statement? If you do not, then we could get on with the questioning—whatever your preference is.

TESTIMONY OF DR. GERALD F. TAPE, U.S. REPRESENTATIVE TO THE INTERNATIONAL ATOMIC ENERGY AGENCY

Dr. TAPE. Mr. Chairman, I do not have a prepared statement.

Senator PERCY. Before you start, I would like to tell you how extraordinary sorry I am that I have to leave. I am hosting a lunch for a dozen Egyptian parliamentarians, and the uniqueness of their being here requires that I leave, but I will read your testimony with great interest, and you are in the benevolent hands of our distinguished chairman.

Senator GLENN. I hope you discuss the nuclear aspects while you are there.

Dr. TAPE. Senator Percy, before you leave, may I say that if after reading, there are questions, I would appreciate a chance to talk to you about them.

Now, Mr. Chairman, I have found in the past, in hearings such as you have had this morning, that perhaps the greatest contribution I can make is to listen to the debate, and pick up a few of the items that would benefit by additional information and clarification.

First, let me say that my purpose in being here is not to comment on the bill itself, in the sense of authorities, procedural arrangements, et cetera, within the various branches of the Government, because that is not my expertise. However, you do bring into consideration matters such as nuclear safeguards, international atomic energy problems, the role of the IAEA, questions of bilateral arrangements versus multilateral arrangements, and I would hope in a few minutes that I could add some perspective at least from my point of view.

Let me first say that the word safeguards, in the American language it is a much overused and misunderstood word.

It is not only used in atomic energy, but it has been used in defense activities and other activities as well. Safeguards, as used by the International Atomic Energy Agency, and as it is reflected in the Non-Proliferation Treaty, refers to the timely detection of diversion of special nuclear material.

It does not specifically address the question of physical security against terrorist types of activities, and so when Senator Percy was addressing the question of what is the Agency doing in the area of physical security, I want to make clear that that authority does not exist under the present agreements involving Agency safeguards.

Now, let me come back to the question of what has been done, but I want to emphasize there is this difference. I think probably what has happened, is that with the increasing attention being paid to a terrorist threat, as contrasted with a national diversion type of threat, we in this country, in our own national system have become much more concerned about the terrorists, and physical security aspects.

We have, by simply including that in our generic coverage of the word safeguard, let that term then cover a much broader list of endeavors than was originally intended, and than is currently included in the international agency safeguards world.

Now, with respect to leadership which was brought up, Dr. Ray indicated many areas in which this country has taken leadership. It has taken leadership in the development of the International Atomic Energy Agency's safeguards, as narrowly defined; it has taken leadership in encouraging the Agency, and in assisting the Agency in the development of guidelines for physical security practices in nuclear facilities, and in transportation. The latter resulted in a book, [The Grey Book] some years ago, that is a guideline type of instruction. The Grey Book has been made available to nations to encourage them to set up within their own national jurisdictions procedures which follow the guidelines. It was not mandatory, but was an expression of leadership; trying to move governments in that direction. This has been looked at again, and The Grey Book is in the process of being upgraded. Many people have indicated the necessity for doing this.

Now, how can one best attack this problem of physical security. I think myself, you can visualize two different ways of going about it, one through an international route, one through a collection of bilateral exchanges. Here one gets into a political judgment. The situation to date is that within the Agency there has been considerable opposition to the notion of an international dictate, or set of rules and regulations, which would be imposed on nations. The concern is one of intrusion on national sovereignty. I believe that although this was overcome for Agency safeguards, having to do with material accountability and inspection with respect to facilities and pursuit of nuclear materials, the time is not ripe for that same kind of process to be used for physical security.

Therefore, in my own view, we were right in starting with the bilateral route. We find that in nation-to-nation discussions, that is what you are doing, what we are doing, what are the important threats, what should we worry about? Both parties can be comfortable in the discussion.

We are not yet comfortable in airing these matters in an international forum, and in laying out the procedures we use or the threats we worry about. Such a process tends to be too public. And so I would urge in this area that we consider the merits of the bilateral route. There are merits in our taking leadership in the international route, but we must watch and be careful, and set our timing to achieve these objectives, in a reasonable and rational way.

I am not disagreeing with what Senator Percy was saying. I am simply saying that I think the political diplomatic approach needs to be carried out carefully, and we should get the most out of whatever we do in an orderly way.

The question of bilateral versus international arrangements comes up in other areas too.

I sense in the debate that has gone on, a general feeling that the United States and the world might be better off having strong U.S. bilateral arrangements. For the export license to be granted only if comparability exists with respect to the United States, has a flavor of a bilateral determination, and in fact an almost unilateral determination, because one must do it our way or not do it at all. But let me remind you quickly, that insistence on doing it our way or not doing it at all with us, does not insure that it will not be done. As was said earlier here today, the United States does not have a monopoly on the export of nuclear facilities, and will not have a monopoly on the export of enriched uranium in the future. Therefore, one has to balance, would we prefer a collection of bilateral agreements between different suppliers and their respective countries, or an international type of agreement in which we all are operating to the same common level of understood criteria.

Senator GLENN. Are these things not mutually exclusive?

Dr. TAPE. Under the NPT, the parties, both suppliers and customers, have agreed that IAEA safeguards is the preferred route. In addition, most major supplier nations, have already said that they would export to non-NPT parties only under safeguards. There is a trigger list that triggers the conditions under which safeguards would be required. More needs to be done in this area to expand its application and to look at other aspects, as well. But let me remind you that the safeguards I am talking about, that have been agreed to, have to do with the detection against diversion, not the physical security type questions that you have also raised. So, at the moment, whatever we do in the physical security area is pretty much dependent on bilateral types of arrangements.

In this area of physical security, let us strive for the maximum through international agreements, let us look to the bilateral route to achieve immediate objectives and move us in the direction we would like to go, but let us not think for a moment that a central U.S. bilateral type control is going to solve all of our problems.

You say let us influence the other suppliers to do the same thing, and, indeed, that has been done, and is being done. Whether it will be completely successful or not, I think remains to be seen.

I would like to add with respect to physical security that it has been suggested by the Secretary that we consider an international convention. This is being explored; it is something we should look at, and see what the merits are. If one has an international convention with a large number of nations agreeing to certain objectives and procedures, fine. But on the other hand, you can see the risks if one goes through the procedure of formulating a convention and then obtains only a few signatories. It then becomes a weak convention, and not the desired strong one. A lot of work has to be done.

Finally, I was going to respond to the discussion here between Senator Percy and Dr. Seamans on this question of the real world and being realistic. I will not go through all of the points I was going to make, except to say that for most of us, the real world, of course, is in the eyes of the beholder, and that I would personally take issue with many of the points that he ticked off. Let me give an example or two.

Nuclear powerplants are looked upon as being prestigious. That was true a few years ago, but many of the developing nations, who are suffering more than we are from oil shortages today, do not look upon nuclear power as prestige anymore. They look upon nuclear power as an actual absolute necessity in their future energy program. And as Dr. Ray was saying, economic stability of those nations, be it aided by nuclear or some other form of assistance, is very much of concern and interest to the United States.

To take another example, included in my real world is the fact that many of these nations can proceed with the development of nuclear explosives independently, and this has been demonstrated. An action on our part of a big stick character does not necessarily cut such development, but may in fact encourage it. But the Senator's comment of let us turn around, making carrots as large as can be made, is probably going to have a greater impact than the negative approach.

These are all interacting pieces that go into the problem of control, the question of influencing such nations to recognize that it is in their interest to adopt and follow procedures of the kind that we have been advocating, both bilaterally and through the International Agency.

Senator Glenn, I tried to pick up a few of the points, that were discussed earlier in the testimony today, in the hopes that I could provide clarification or amplification.

Senator GLENN. Your comments are very well taken, and they are excellent. I appreciate your picking up on them. What is your time schedule? That is a vote that just came up, so I will have to run over and vote and come back.

Dr. TAPE. I will wait.

Senator GLENN. You will be available then for a little while, because I do have a number of questions, and I will get over there and back as soon as I possibly can.

Dr. TAPE. Fine.

Senator GLENN. I am sorry we have been so long here, but we have had too many expert witnesses.

Dr. TAPE. I do have other things tomorrow, and I would prefer to stay today, if that is all right with you, Mr. Chairman.

Senator GLENN. I will get back as fast as I can, and we will stand in recess for about 10 or 12 minutes.

[Whereupon, the committee was in short recess.]

Senator GLENN. The hearing will be in order.

I am sorry for the interruption, doctor, but that is one of the hazards of the committee hearings these days, so I got back as fast as I could.

Do you have any further statement before we have a little discussion?

Dr. TAPE. I am an expert at filling in while Members are voting.

Senator, I might add one other item by way of clarification, namely, differentiation between IAEA safeguards and some physical security questions. I should not leave you with the impression that the IAEA safeguards is only a material accountability type system.

It does include as part of the system for obtaining information, checking on inventories, checking on locations, et cetera, methods of containment and surveillance. Putting materials under lock and seal and monitoring is in a way a physical-security type of system. Surveillance with cameras on the movement of materials, within a plant, et cetera, which will then permit checking at a later date is also a physical-security type of system. It is not security in the sense that it prevents a terrorist group or unauthorized persons from physically breaking the seals and removing the material. It does not incorporate a quick-acting mechanism of police-type followup. That is the point I would like to make in differentiating between the two.

Although I refer to safeguards as detection against national diversion, I really am using the word national to mean the nation we are talking about. It could be detection against national or it could be detection against subnational diversion, in the sense that the government itself is not a party to it, but that some unauthorized persons within that country are responsible.

One other point, with respect to the safeguards systems, we tend to compare the United States against the IAEA. Let me first of all emphasize that the U.S. safeguards system is a national system for the United States. The IAEA builds on the national systems which exist in those countries which are under IAEA safeguards. In other words, IAEA takes advantage of existing national systems, and then fills in to the degree necessary in IAEA's judgment to get the adequate information it needs to make an independent determination. So the international system is one of an added overlay to already existing national systems. It is not a replacement for a national system, it is an add-on. With that, Senator, let me stop, and if there are questions, I would be pleased to answer them.

Senator GLENN. Let me follow up on your last statement. You stated the IAEA is a setup to take advantage of the national systems that are already in place, and make maximum use of their facilities, and so forth. What happens when we consider those to be considerably less than we think they should be?

Do you think we should then restrict our sales in those areas?

Do we sell, what do we do?

Dr. TAPE. Let me assume that the case you are talking about is an NPT party, which by agreement with the Agency has IAEA safeguards. The IAEA will have worked out with that nation the types of information, reports, et cetera, which the IAEA needs to do its job. It will have set up frequency of inspection for various facilities, depending on what they are, et cetera. The IAEA will insist on reports of imports, exports, et cetera.

The IAEA itself in its safeguards undertaking will be working with that country to have that country upgrade its own national safeguards to a level which will not put an undue burden on the Agency itself. In other words, the Agency is not interested in expending Agency funds to do the national job. There will be negotiations and pressure put on the country to do its part adequately.

With respect to the question should we export if it is an NPT party, if it has an IAEA safeguards agreement, which it should have under those circumstances, I say that we, under our NPT obligations there, are expected to——

Senator GLENN. As you pointed out earlier, the IAEA functions more as a monitoring system where the plutonium is, as I understand it, and it is more our sort of international accounting system for plutonium. But then the followup—what happens if somebody like India gets off the reservation, and uses plutonium in other areas, and plutonium disappears, what happens at that point? It is just sort of information, then what occurs?

Dr. TAPE. Let me first state that the system applies to all special nuclear materials, and this could be uranium or plutonium. Let me also emphasize that many of the cases that we tend to talk about involve reactors, for which there is a delivered fabricated fuel element. Most of the power reactors of today utilize a fuel with a very low-enriched uranium content. That fuel element goes into the reactor, it is used over a period of time, becomes very, very radioactive in that process, goes into the storage cooling ponds, and, again, one does not even touch it with an 11-foot pole, to differentiate from the ones you do not touch with a 10-foot pole. Thus there is built into the system a lot of protection in addition to the safeguards accountability and monitoring.

Now, the plutonium you talk about in a power reactor fuel for instance is plutonium contained in those highly radioactive fuel elements. If I remember correctly, the fuel elements we are talking about are maybe 8 or 10 inches on the side and 12 or 14 feet long and weigh a thousand to 1,400 pounds. It is not easy for me to construct a reasonable scenario of a terroristic type approach involving removal of such elements.

Before someone can get his hands on plutonium per se it has got to go through the reprocessing plant, which may or may not be in that country. That is where the ultimate plutonium will come out. On the other hand, the records would show the amount of the plutonium produced and the exports from the country.

Coming back to India, India is not a party to the Nonproliferation Treaty. India has a number of facilities in its country, some which they obtained from other countries, some under IAEA safeguards and some under agreements made before IAEA safeguards were established, but accompanied by a statement that the material would be used for peaceful purposes.

The two Tarapur reactors which were obtained under agreement with the United States are under IAEA safeguards, not the NPT, but so-called trilateral arrangements, involving India, ourselves, and the IAEA. The United States, preferring an international arrangement for the purposes of making these international inspections, has used the Agency. The specific information coming from such inspections is confidential, between the Agency and the party, India. On the other hand, if the party inspected is willing to discuss these matters with the other party of the trilateral, it can be done.

Senator GLENN. What happens if they do not? That is one of the weaknesses. This IAEA confidential relationship means we do not really know.

If we are under IAEA, and we sell to a nation, and they in turn are dealing with IAEA, we never really know what the safeguards are, or what arrangements are being made, unless they are given to us voluntarily, as I understand.

Dr. Tape. That is essentially correct, but let me say, by virtue of the fact that we have close relationships with the Agency, we supply experts, for example, to help them with their procedures, we are pretty well informed of the way in which the procedures operate, and we are able to get the information of a rather general nature by working with the Agency. Thus far, in these arrangements, the individual countries are, I think, most of the time interested in making nations like the United States aware of the fact that they are doing a good job. In other words, it is not always an adversary relationship; the country can say look, we are doing what you expected us to do.

Now, let me go to the point where there may have been a situation in which the Inspector General cannot reconcile the information, and he is unable in consultation with the country to determine whether or not there was a diversion. In that case, he reports to the Director General, who reports to the Board of Governors of the Agency, the Board of Directors, if you will. The Board must consider the facts, whether there were some special circumstances, whether the Nation itself wishes to be heard on the situation. That has never occurred as yet. If indeed there should be some serious matter, then the Nation is confronted with a report to the Security Council of the United Nations, and the question of sanctions. All of these are possible, but at this point, we would be speculating in terms of what action might be taken.

In our own case, if such happened under one of our agreements, we would consider very carefully as to whether or not it was so serious we might not wish to cut off the shipment of future enriched uranium for the reactor, for example. In today's energy crunch, where these power reactors are generating large blocks of electrical energy, that is not a trivial consideration.

Now, again, in the Indian situation, the plutonium in the explosive that they detonated, they assured us, did not come from the Tarapur reactors. The indications are that it came from a Canadian supplied reactor which the Indians had refueled with India's own fuel. So one can argue that the plutonium was not generated from foreign uranium, it was generated from their own supply.

Senator Glenn. And that is where the fine line is, I gather.

Dr. Tape. That is the name of the game. If a country really wishes to develop its own capability, an indigenous capability, the route to go is to build the complete fuel cycle.

Senator Glenn. You commented a little while ago about the bilateral arrangements, bilateral agreements among suppliers.

The proliferation difficulties with respect to what is going on—how do you see those from an IAEA standpoint?

Dr. Tape. Let me take the case in point, and I will pick let us say a Latin American Nation, not a party to the NPT, call it nation X. Let me assume that X wishes to embark on a major nuclear program, involving additional power reactors, fuel fabrication facilities, fuel reprocessing facilities, et cetera. Now we have companies in the United States as was indicated, that would be quite interested in supplying this type of equipment, but let me leave the commercial supply question out of this for a moment. Before exports of equipment and materials could be made the executive branch and NRC, would have to consider the conditions under which such exports could be made. Ultimately there would be a bilateral arrangement. We would certainly insist on safeguards, Agency safeguards. We have already said that, to the extent that we insist on other conditions, they would be in the bilateral agreement, not the export license, but in the initial bilateral agreement.

Now, the United States is not the only exporter Nation in the world. You must assume that countries like country X have been also talking with the Federal Republic of Germany, they might be talking with Japan, they might be talking with France, and in each case, country X will be looking not only at the economics, which is a commercial aspect, but they will also be looking at these other conditions that we have been talking about this morning in terms of whether they are tolerable, favorable, unpalatable, et cetera. They will be looking at loan agreements, can they get better loan deals from another supplier than they can from us. All of these conditions will go into the decision package.

We have had as an objective, trying to get safeguards in its fullest context out of the marketplace. We do not want to have the recipient customer buying on the basis of the best deal in safeguards from its point of view. And so by going the international route, and getting France, Germany, the United States, whoever the supplier might be, to insist on essentially the same level of safeguards there could be essential uniformity. We think that has a great advantage, because then we will not start seeing undercutting on safeguards. IAEA safeguards provides for the common base.

If we can move in that same direction with physical security by understandings among the suppliers, in terms of similar standards, that would be fine.

Senator GLENN. But don't we have a wide variation amongst suppliers on exactly that point right now as far as what they demand? Aren't we in a position to deal not only businesswise and costwise, but the safeguards-wise also?

Dr. TAPE. Senator, I would have said there were variations a few years ago. I believe that most of the suppliers are realizing that it is to their advantage, and everyone's advantage not to get into this marketplace consideration.

There are some countries which have a preference for bilateral arrangements, over international type arrangements. This is a policy-type preference on the part of the country.

Although I might argue with my IAEA counterparts about their positions on certain matters, they have political bodies that make their own decisions, and these may differ from ours. For example, in France, which has been mentioned from time to time, the French position, certainly of late, has been it will not export without safeguards, but it will not necessarily insist that they be IAEA safeguards. They may be French bilateral with the country concerned, and there I have to say to you, I know less about them than about IAEA safeguards. I can only say that the French tell me they are adequate. If, however, the French would say in the future, we will export only under IAEA safeguards, I would have a better appreciation of what that means. Then continuing our same leadership with the IAEA, providing them with help, expertise, consultants, and equipment, and continuing our consultations with other members, improvements can be made.

We have a tremendous development program in this country. We want to make the equipment coming out of it available by way of benefit to the Agency as we have in the past.

Senator GLENN. There will be a nonproliferation review conference next month in May, I believe, in Geneva.

Dr. TAPE. I believe it starts on Monday or Tuesday.

Senator GLENN. Yes, next week. Will you be attending that, as an IAEA member, going there?

Dr. TAPE. I personally will not be attending, not because of lack of interest, but because of too many other things to do at this point.

Senator GLENN. Have you been consulted with what our stand will be at that meeting?

Dr. TAPE. Not in the sense of what our stand will be. Let me amplify, however. The IAEA itself has been asked to prepare a number of papers for review and presentation at the conference, and these have to do with their areas of expertise and responsibility.

Within the executive branch here, there has been a group doing the same thing with respect to the U.S. positions.

Senator GLENN. That was going to be my next question.

Dr. TAPE. Let me add one more thing. The United States maintains in Vienna a mission office which is similar to the U.S. mission to the U.N. in New York, but much smaller.

The man that we have in the Vienna Mission who is an expert in the safeguards area will be in Geneva for that part of the conference dealing with these matters.

Senator GLENN. The reason I was raising these questions, I hope that your experience and expertise in the IAEA area, and if you want to comment on whether NRC, and ERDA, and the Department of Commerce, and all of the rest of the people involved in this whole field, are also involved in what can be so very vital as to discussions, whether they are all being consulted, so we have this wide participation in this area, as we possibly can have, or is this just being run as a State Department exercise at the NPT Review Conference?

Dr. TAPE. My view is that there has been input from all of these quarters.

Senator GLENN. Is it an impression, or is that the case?

Dr. TAPE. I have talked to the man involved. The point I would like to make is that there is strong expertise in ERDA, NRC, State, in these areas. The strongest expertise has been in ERDA, and given the recent reorganization some people in one organization are now in another, but the expertise is there.

Senator GLENN. Way back at the beginning, of what we might call the nuclear age, the Baruch and the Lillianthal plans made for placing sensitive aspects of the fuel cycle, including the reprocessing of plutonium under international management.

Now, I would probably personally think we have gotten maybe beyond that point now, where such controls could be exercised, but you are of course working in this international area, and one of your first statements here about the advantages of nuclear plants, and the nations no longer are just considering them in the show-off category, or you might call the show and tell category they were a few years ago, getting beyond that, I think now there is a proliferation of enough plants around the world, would you not think it is now beyond the point where we can really put things under international management?

Dr. TAPE. I do doubt that one could put them under international management in the context of the original suggestion, the Baruch plan, et cetera.

That, you will recall, was proposed at the time when we really did have a monopoly on the nuclear weapon, and it was based on the fact we were willing to give up. But the Soviets, principally, were working on weapons development and wanted to hold their options open.

Senator GLENN. The monopoly was more tightly held than it is now?

Dr. TAPE. It is a different monopoly.

Senator GLENN. Yes.

What do you see as the relationship between the bilateral versus the IAEA relationship? How will this be affected?

Well, let me back up.

I think one of the things we will see in the next few years is that we will find otherwise, that is, other ways of developing nuclear materials, as are already beginning to come to the fore as possibilities, whether it be laser, and some of these other techniques, or possibly even chemical processes that may work in this area of reprocessing or enrichment.

I think as we go along, and science makes more advances, the enrichment of uranium and reprocessing of plutonium will probably become far less of a formidable technological hurdle than it is right now.

Would you see this, in other words, the ease with which plutonium could be used and reprocessed—how do you see this working in terms of making our need for bilateral agreements, which you discussed—more important, less important, or going to more international controls, or organizations. Do you see any difference really?

The reason I bring this up, what we are trying to do, is a line of process here, whereby we can improve, with a good interagency setup, and whatever safeguards we put in, our system in this country.

Now, with the existing fact, that I think this is the probability, that this is the way enrichment and reprocessing will develop, does that change the position we have with our interagency setup, as relates with our setup, bilateral agreements, and international agreements—if you follow that?

Dr. TAPE. Let me start first with the domestic side, and talk about chemical reprocessing, meaning the separation of plutonium, and then the utilization of that plutonium in fuel elements, which means feedback into the fuel fabrication side.

It is difficult for me to see, in anything like the near future, any different type of reprocessing, than we are now contemplating. I think it was one of the witnesses this morning, Mr. Anders, who said with respect to reprocessing plants that we have one which is shut down for modification, another which did not get started up, and a third under construction, or to put it another way around, we do not have any such plant in operation on the licensed side of the house. There are processing plants elsewhere in the world.

It is a very complex, difficult technical problem and very costly. In the world of extreme inflation that has taken place, many people are taking a look at whether or not one needs to reprocess immediately, or whether there is an advantage to storing the fuel elements and waiting. So for the present, I do not see a change in what we see today in reprocessing.

We may reprocess at a rate in which we need the plutonium to feed into plutonium recycle or breeders.

Now, as a separate issue, I look upon plutonium as an energy resource, and to me, plutonium is an energy resource which should be used. Therefore, I personally would like to see the mechanisms developed, safety and safeguards procedures, such that it can be done, and done in an orderly fashion. Therefore, I would ultimately like to see the plutonium fed back in and burned, in the nuclear sense, as another available energy resource. For those who worry about the vast stores of plutonium that may be around in the future, the safest plutonium is the plutonium that has been fissioned in a reactor. That is sort of the scenario I would like to see for the future.

Now some remarks with respect to some of the new enrichment schemes for enriching uranium. We have relied on safeguards as a method of controlling special nuclear materials. Enriched uranium comes from enrichment plants, which are of a size, complexity, cost, et cetera, that there are not many of them in the world. One could easily identify them by one means or another.

It would be more difficult to identify a clandestine type of operation, for example, a centrifuge operation for small amounts of material. As far as a centrifuge plant for commercial use, that is, enrichment of fuels for commercial nuclear power, that has to be a fairly sizeable plant and would be easier to detect. But for someone who wants a little bit to make in a clandestine weapons program, that is a much tougher operation to detect.

With some of the newer processes, the one you heard about, the modified South African process, that will probably be a very large plant, so again we should know where the plant is. It is my view that countries like South Africa having such a plant will ultimately do this for export purposes principally, because they have the raw material, the uranium ore is there in the first place, and I doubt very much they will export without safeguards, because they too share the concern the rest of us have.

As to laser enrichment, I just think that is too early to even talk about it. It is a laboratory process at the moment. It has potential, and we will be thinking about how it interacts with nuclear power and safeguards.

Senator GLENN. All I was pointing up, every other major technological development we have ever had, starts out as a breakthrough, with only a few people are familiar with, and pretty soon everybody has it, and it is commonplace, and I would presume that while nuclear energy may be one of the most complex things we have ever developed, it still is becoming far more complex. I am sure there will be simplified developments for handling or use, as you pointed out, as plutonium is left over, and I just think of the types of setups we can make, that we are primarily concerned with our efforts to reorganize, and better handle. We ought to be considering the commonality of plutonium, and nuclear processes, and their tendency to become more common, as time goes on, and whether we can through our organizational efforts that this bill addresses, that we are talking about today, where we can design an organizational setup to take care of the bilateral, or IAEA type of thing, or other structures as everything surrounding nuclear energy becomes more common, and more highly known.

I guess that is more of a statement than a question. Let me ask a couple of things. We are very late.

Dr. Ikle has spoken on the prospect of nuclear anarchy, unless France and China join the other nuclear nations in ratifying the Nonproliferation Treaty.

Can you comment on their reasons for not ratifying, or do you feel that their own arrangements bilaterally are in a way protecting us as much as they would as if they were members?

Dr. TAPE. I mentioned France earlier, and I would like to repeat what has been said by the French at the highest levels, that namely, although not a party to the NPT, France would behave as if France had signed the NPT. Taking that at face value, which one must do, and I do, their actions will go a long way toward alleviating some of the troubles we are worried about with respect to nonnuclear weapons states.

Obviously, from a political or public relations or psychological point of view, and believe me, world peace is built to a considerable extent on public attitude and psychology, it would be better if France could indeed find its way clear to becoming a party.

With respect to the People's Republic of China, I believe the PRC does wish to show its nuclear preeminence. Thus far, it has only been in the military field, that is, they have not entered seriously into the nuclear civilian electric power program. I have no indication that they are interested in building for export purposes, as a supplier nation.

Senator GLENN. That is France now?

Dr. TAPE. China, the People's Republic of China. It has really exhibited its nuclear prowess in the detonation of military type devices. It has not entered into a large development program that we are aware of in nuclear reactors, for civil purposes, nor have we seen any interest in exports. So I am simply saying that for the PRC, I think that is way downstream. They probably just look upon NPT participation first, as a position not politically acceptable to them, and, second, an issue that probably just does not make that much difference.

Senator GLENN. France is sort of ignoring the rest of the world as far as world opinion goes, as far as selling plants around the world, and sort of ignoring all of the protection mechanisms. I mean that organizationally speaking, that the rest of the world has sort of accepted, and yet no one seems to be overly critical of France these days.

Why is there reason to think if we are much tougher with our safeguard system, and just demanded that as part of our doing business around the world—why should anyone think less of us, or not do any business because of that? Are we being too easy, in other words?

Dr. TAPE. I believe that France has taken the point of view that in its judgment, the type of arrangements, safeguards, et cetera, that they can achieve, are satisfactory and adequate.

We might not agree in every detail with their point of view. I am reluctant to use the word realistic, which came up here earlier this morning, but I think they would argue that in some cases they are being realistic, that is, by taking a position which is not as hard as the United States might take, they can get an agreement for the near term, where there might not be an agreement at all.

For example, we have had some debate with respect to certain safeguards agreements with certain countries, as to the length, that is, the time duration of that agreement on a particular facility. We tend to hold out, for an agreement that would run for the life of the reactor. Others, where the going is tough, would be more apt to try to get an agreement that might be for say 10 years, rather than drive that country to a position of building its own reactor, and starting its own indigenous capability. Mr. Chairman, these are matters of judgment, of weighing long-term and short-term objectives, et cetera, and I do not think there is a magic answer to it.

Senator GLENN. Let me get back to one that may be a bit more specific, than these judgment areas, that we are trying to organize and provide for.

Do you think the United States is in violation of the Nonproliferation Treaty by licensing nuclear exports to non-NPT nations that have not placed all of their nuclear materials and facilities under IAEA safeguards?

Dr. TAPE. No, we are not in violation of the treaty.

Here again is a judgment situation. Is it in our interest to work with a country that is not an NPT party, in the interest of getting the facilities which are supplied under safeguards, and even under conditions beyond just the acceptable international safeguards, such as physical security, or agreements of where fuel will be processed or fabricated.

Senator Percy said here earlier that when the Israeli-Egyptian package came up for consideration, there was a loud hue and cry. No question, I would have much preferred both of those nations to have been parties, and we could have dealt with them as NPT parties, and I think the people in the country felt that way.

On the other hand, when I look at what conditions might be obtained by dealing with them, we should not close our eyes and turn our backs, because it may very well be in our interest to work out satisfactory arrangements which are just short of being a party to the treaty but have other compensating factors.

Senator GLENN. With regards to IAEA, and you are directly involved with it, how will we build up confidence in IAEA, enough that we really feel, as long as there are negotiations with individual nations that remain unknown to the rest of us, are you into that enough that you have a great, a high confidence level that we are being adequately protected, or do we know all that is going on?

If there are secret arrangements between IAEA, and if all of those agreements are confidential between IAEA and member nations, the rest of us, who are not privy to such information, automatically look not too well at it, and wonder whether the safeguards and the protective information is really there.

How do we build confidence without having the information?

Dr. Tape. I assure you, the Director General of the agency, and the witnesses before you have talked about this question.

From the point of view of making all of this information pretty much open, I think we would destroy the system which has been built up, and so I argue for confidentiality.

If we were to ask the General Accounting Office, which would be the normal congressional method, to make an examination, that too, I think, would tend to destroy it. Then there would not be only the U.S. General Accounting Office in there, but 105 other general accounting offices looking at it too. So, I do not think that is the solution either.

The Director General announced at the February Board meeting that he intended to create an Advisory Committee to be made up of experts in the area of safeguards, and they, as consultants to the agency, would have the power of investigating and advising him on the adequacy of the procedures, techniques, and the work going on in safeguards.

I do not say this is a complete answer to your question. But I think it is like answers to similar questions of how can the chairman, how can the Director, how can the President assure others, who are not necessarily privy to the internal workings of that body, that the man at the top is on top of it. The Advisory Committee will be a step in trying to help answer that; the Director General himself can say, I have had these consultants, not internal employees of the agency, looking at it.

Senator Glenn. What happens when there are violations? That is an area that we have not gotten into really.

IAEA discovers something, it can give information, then what happens as in the case of the Indian tape. We have pretty good evidence, I guess, that has been given to the committee staff, that India did something with respect to recording the amount of plutonium. But then what happens? What will IAEA do in a situation like that besides provide the information to some other country?

Dr. Tape. On this question of the tape, I had not heard about it. But let me speculate, because I think I know a little bit about the Indian attitude as to the application of international safeguards.

The Indians are concerned, at least this has been expressed to me, about the removal of original records from India, so that they would no longer be within their control. For example, this case might very well be in that category. An inspector came in and made a measurement, which they did not have in duplicate, or access to it. The inspector goes away, and then makes some accusation of diversion. The Indians at that point refute it but they have no way to countering it. Now, if that is the situation, then I can understand that sensitivity, and, indeed, if that is the way it developed, what we ought to do is find ways in which, if records must be removed, India as a nation, would have a duplicate.

Senator Glenn. I was using that more as an example.

Dr. TAPE. If there is a violation, what happens first, is that the safeguards department of the agency, in its analysis of reports and records, will not be able to reconcile the inventory. There will be a missing quantity of materials someplace. The agency goes back to the country involved, stating that their analysis shows a significant discrepancy. They ask for additional information which could reconcile the discrepancy.

Inventories might be rechecked and so there will be some period of time during which an attempt is made to reconcile these differences.

If the Inspector General cannot reconcile that difference, then he must go to the Director General, who in turn goes to the Board of Governors, and says, we have been unable to reconcile this difference. At this point, if the Board agrees that it is a serious matter, it will go to the United Nations. What happens then is the matter becomes known to the Board and to the U.N. This puts the issue into the political arena of sanctions, of world opinion, and so forth.

You may decide that that is not adequate. But I think that it is consistent with the nature of our present world society. Each nation tends to do its own thing, with a self-evaluation of whether to take the risk or not.

Senator GLENN. Well, I have no further questions. Do you have any last statement you would like to make? I appreciate very much your expertise, and I am sorry we delayed you until it is so late.

It is after 2 in the afternoon, and we did not intend to run so late, but I certainly appreciate your expert testimony.

I would like to feel that the committee could follow up with questions by mail, or by getting in touch with you, if they so desire after reading through the transcript of today, which will be very long, of course, but it has been a very informative day, I think, for all of us. We have another day, tomorrow. It starts at 10 a.m., and the committee will stand in recess until 10 tomorrow.

[Whereupon, the committee was recessed at 2:10 p.m., until 10 a.m., May 1, 1975.]

THE EXPORT REORGANIZATION ACT—1975

THURSDAY, MAY 1, 1975

U.S. Senate,
Committee on Government Operations,
Washington, D.C.

The committee met at 10:07 a.m. in room 3302, Dirksen Senate Office Building, Senator John Glenn, presiding.

Members present: Senators Glenn and Percy.

Staff members present: Dick Wegman, chief counsel and staff director; Paul Leventhal, counsel; Marilyn A. Harris, chief clerk; Elizabeth A. Preast, assistant chief clerk.

Senator Glenn. The hearing will come to order.

This is the third and last day of a series of hearings with regard to the bill which would realine some of the agencies' functions with regard to the licensing of peaceful nuclear exports.

Our witness list today will have Mr. Eldon Greenberg. He is a staff attorney for the Center for Law and Social Policy, representing the Sierra Club, National Resources Defense Council, Friends of the Earth, the Environmental Defense Fund, and the National Parks and Conservation Association.

Our number two witness today will be Mr. Carl Walske, president of the Atomic Industrial Forum, Inc.

The third witness will be Adrian Fisher, dean, Georgetown University Law Center, former U.S. negotiator on the Nuclear Non-Proliferation Treaty.

And the fourth witness will be Admiral Gene La Rocque, Director of the Center for Defense Information.

We welcome all of you today and look forward to your testimony. We have heard from some of these people before on related subjects and look forward to the sort of fine testimony that we have had before.

Is Mr. Greenberg prepared at the present time? I believe we have some copies of your statement. I do not know if you have additional copies available for the other people here or not.

TESTIMONY OF ELDON GREENBERG, CENTER FOR LAW AND SOCIAL POLICY, REPRESENTING THE SIERRA CLUB, NATURAL RESOURCES DEFENSE COUNCIL, FRIENDS OF THE EARTH, THE ENVIRONMENTAL DEFENSE FUND, AND THE NATIONAL PARKS AND CONSERVATION ASSOCIATION; ACCOMPANIED BY JEFFREY KNIGHT, FRIENDS OF THE EARTH

Mr. Greenberg. I have given the clerk additional copies of my statement.

Senator Glenn. Fine. Thank you.

Would you prefer, Mr. Greenberg, to have your statement read into the record or submit it for the record and comment briefly. How do you prefer to handle it?

Mr. GREENBERG. I will summarize it.

Senator GLENN. I think if you read the whole thing it would take up our entire time today. We do appreciate the depth you went into in your statement. Perhaps you would care to summarize it.

Mr. GREENBERG. Mr. Chairman, I had not intended to read the entire statement, recognizing that it is far too long in a hearing such as the present one. However, I would like to submit it for the record and summarize in my oral presentation this morning the central points made in the written statement.

Senator GLENN. Your entire statement will be inserted at the conclusion of your testimony.

Mr. GREENBERG. Before proceeding, I would like to introduce Mr. Jeffrey Knight, who is the legislative director of Friends of the Earth, one of five environmental organizations which I represent.

After I complete my presentation, Mr. Knight will have one or two more words to add concerning the views of Friends of the Earth.

Senator GLENN. Fine. I am glad you could join us.

Mr. GREENBERG. Mr. Chairman, the importance of rationalizing our regulatory framework and asserting a greater control over nuclear export activities cannot be overemphasized.

It is fair to say that given the current lack of scientific knowledge, regulatory competence and political stability worldwide, the environmental groups which I represent have serious misgivings about proceeding to promote fission power development at this time.

However, upon the assumption that nuclear exports may continue, I intend to leave aside that question this morning, and focus on why the environmental groups believe there is a need for legislation such as S. 1439, why they believe such legislation can be effective, and how they believe such legislation might be structured.

The size of our nuclear export program is well documented and need not be repeated here. This size has been achieved over the past 20 years with little analysis having been made of the risks which the spread of fission power poses.

In particular, the combination of both promotional and regulatory functions in one agency has led to the promotion of nuclear power as a purely commercial enterprise at the expense of careful regulation.

Specifically, as regards to the adequacy of the current regulatory scheme in the United States, I would point out five particular areas where remedies are appropriate:

First: The key stage in the overall nuclear export process has been the negotiation and conclusion of agreements for cooperation which have established the safeguards requirements applicable to transfers of nuclear equipment, technology and fuels. No independent, nonpromotional agency has an effective check, at this state of the process, over safeguards procedures to which the United States commits itself.

Second: In establishing safeguards under agreements for cooperation, there has been complete reliance on the international IAEA system of accountancy. This system is designed only to detect diversion. It cannot prevent such diversion, and it does not provide for physical security or other protective measures. In our view, the IAEA system, as presently constituted, is not sufficiently able to deal with the full range of risks associated with fission power development.

Third: The authority for issuance of export licenses within the United States has been split among several agencies. And this split of authority unnecessarily increases the risks of a lack of effective coordination among the responsible Federal agencies. Moreover, some transfers, particularly the transfer of technology, have been virtually unregulated under our current system of export licensing.

Fourth: There has been a lack of substantive review in actual licensing proceedings themselves. The committee is well aware of the fact that safeguards have not been independently reviewed by the AEC in the past and now by NRC in connection with export licensing. It might also be worthwhile to point out that under current procedures, NRC does not examine health, safety or environmental impacts which might be associated with the grant of a particular license.

Fifth: There has been a lack of procedural safeguards within the system. In particular, I might point out that, with regard to the licensing of the export of special nuclear material, there has not even been public notice in the Federal Register or otherwise of the filing of license applications or the commencement of licensing proceedings. Thus, the public has been kept in the dark as to the status of current licensing.

Before going on to discuss the particulars of S. 1439, I would like to state briefly that we believe that legislation such as S. 1439 can be effective. I know the argument will be made that imposition of unilateral standards by the United States will competitively disadvantage the United States' nuclear power industry, driving foreign countries, anxious to obtain nuclear power, to "irresponsible" foreign competitors, and diminishing our ability to influence nuclear power growth worldwide.

The problem with that argument, if accepted, is that it leads to the inevitable conclusion that the United States cannot impose standards any higher than those of our most irresponsible competitors. The end result is that the lowest common denominator prevails and that the United States has become just as irresponsible as its competitors.

I further believe that the argument that unilateral standards are ineffective and counterproductive in the long term simply fails to recognize the still powerful position of the United States in the nuclear power industry. With our commanding position in the market, it is far from clear that imposition of additional standards would undercut the competitiveness of our industry. It might equally be possible that suppliers of technology outside the United States would follow the United States' lead, for they, too, as nuclear powers, have an interest in restraining the spread of nuclear weapons and protecting the world community against terrorist activity or environmental disaster.

I think the point was well made by Senator Ribicoff, in introducing this bill on April 15, that time is running out, and that we must take action now if we are to exercise world leadership on this important issue.

With regard to S. 1439, the environmental groups which I represent firmly favor the concept behind this legislation. It is essential, in our view, to transfer safeguards authority out of a promotional agency such as ERDA and into an independent regulatory body.

I have a number of specific comments, however, with regard to the structure of the export licensing process as suggested by S. 1439, which I hope will assist the committee in its effort to develop legislation:

First: We believe that licensing authority should be centralized in the Nuclear Regulatory Commission and not in the Department of Commerce. There are at least three reasons for our conclusions in this regard; (1) we believe that placing licensing functions within the Department of Commerce will raise, yet again, the same problem of an agency combining both promotional and regulatory functions which the Energy Reorganization Act of 1974 was designed to end; (2) we do not believe that the Department of Commerce has the expertise to make any substantive decisions associated with the consideration of nuclear export licenses; (3) we believe the argument that has been made that the Department of Commerce' ability to handle speedily export license applications is not a justification for a transfer of authority to that agency. What is needed, in our view, is a less perfunctory licensing process, with more detailed scrutiny given to the particulars of individual license applications.

Second: We believe that control over the negotiations of bilateral agreements for cooperation should be strengthened. I do not think that the bill as presently drafted, focuses enough attention on this vital aspect of the export process.

Even if certification authority is vested in the NRC, the safeguards embodied in an agreement for cooperation will be a dominant factor at the stage that the export license is actually considered. It will not be easy, 8 to 10 years down the line, after a prospective foreign purchaser has invested millions of dollars in nuclear equipment, for NRC to deny a license application on the grounds that the safeguards embodied in an agreement for cooperation are inadequate.

Thus, we make the following two suggestions; (1) the criteria established by NRC for use in the development of agreements for cooperation should be met before such agreements can be concluded. To merely provide for the use of such criteria is not enough; (2) a nuclear proliferation assessment statement should be prepared in connection with the negotiation and conclusion of an agreement for cooperation as well as in connection with the licensing application itself.

The third point which I have to make with respect to the bill is that the review criteria should be expanded. By review criteria I mean the safeguards review criteria and other substantive criteria which might be taken into account by a licensing agency.

With regard to the safeguards criteria, in order to make a meaningful judgment as to the appropriateness of specific safeguards measures in specific countries, the regulatory and political climate of such countries must be analyzed in detail. Safeguards which are comparable to U.S. safeguards in one country may be sufficient in that country but not sufficient in another country to protect against the risk of diversion. Consequently, we would suggest that, in addition to a requirement of comparability, there be a requirement that safeguards be "adequate" to protect against the risk of diversion, sabotage or theft in the recipient country.

Fourth: It seems clear that some effort should be made to relate U.S. standards to standards which might be developed internationally. The bill, as drafted, represents a unilateral approach to the safeguards problem. We believe that unilateral action may be necessary in order to achieve adequate protection of the nuclear power fuel cycle. However, in an ideal world, we would ideally like to have an adequate international agreement, because we are dealing not just with the United States in the nuclear field, but with numbers of other foreign suppliers as well. It is necessary, in our view, to bring all of the suppliers of nuclear technology, equipment and fuels under adequate control.

Thus, we would suggest a scheme under which NRC would still be required to promulgate and impose its own safeguards standards. If, thereafter, a multilateral agreement could be worked out, containing substantially equivalent standards, then, in any particular case, that agreement could replace U.S. unilateral safeguards, subject to the caveat that adoption of the multilateral accord would not impair the United States, right to later impose more stringent safeguards if deemed appropriate in the public interest.

Fifth: We believe the provision should be made for appropriate public participation in the export licensing process. Public procedures are important especially for groups such as those which I represent. In particular, in licensing proceedings, in the establishment by NRC of safeguards criteria, and in connection with consideration of nuclear proliferation assessments, we would suggest that it is appropriate to require there be public notice and opportunity for public comment.

Sixth: And finally, we believe that a greater role should be given to the Arms Control and Disarmament Agency. It is not enough, in our view, merely to offer an opportunity to ACDA to participate in the export process. It has that opportunity now, but it is not utilizing it, at least as far as I am aware. I think it is necessary to require by law that ACDA, which has expertise concerning the political risks of nuclear proliferation, take an active role in the export licensing process. This might be done by requiring ACDA to prepare the nuclear proliferation assessment statement and to submit it to NRC in connection with the licensing process.

Mr. Chairman, in conclusion, I believe that Congress is moving in the right direction with legislation such as S. 1439. It is critically important that Congress follow up on the wise choices made in the Energy Reorganization Act of 1974 to separate promotional and regulatory functions in the area of nuclear exports and to vest control over safeguards and other regulatory considerations in an independent licensing or certifying agency with expertise in nuclear power. Unless the United States takes the lead now in placing adequate controls over the international fuel cycle, it may well be too late.

Thank you. That concludes my prepared presentation. Jeffrey Knight has one or two words to say, and then we will throw ourselves open to any questions you may have.

Senator GLENN. All right. Mr. Knight.

Mr. KNIGHT. Thank you, Mr. Chairman.

I just want to thank the committee for its work done last year in creating ERDA and the Nuclear Regulatory Commission. I think that this separation of promotional and regulatory responsibilities was long overdue in the nuclear field. I want to stress that this same split ought to be continued in the international field. I do not think that we can allow our zeal for exports to overcome the need to place responsible safeguards on those exports.

Specifically, I recall a statement by former AEC Commissioner Dowb a few years ago. He indicated that the benefit to the U.S. balance of payments from nuclear exports would be in the billions and billions of dollars just by 1980. I think, with our problems with oil and the worsening of the position of balance of payments, we have got to be sure that we do not let safeguards and safety issues slide by in our efforts to export nuclear power.

I think the responsibility for this should not be in the Commerce Department which is a promotional agency and should be in the Nuclear Regulatory Commission.

I also think the committee ought to keep in mind, as it is setting criteria for the various sections of the bill, that we are exporting a technology that we do not yet have full control over, specifically in the areas of safeguards, of waste management and disposal, and, some would say, in the area of reactor safety. I think we ought to have a very great concern about whether the foreign countries to which we are exporting this technology can handle it, whether they have the physical and technological resources and the personnel to be able to deal with it in a manner that is responsible and safe, and, also, whether they have plans to deal with other areas of the nuclear fuel cycle which we do not choose to help them with, such as waste management.

Thank you.

Senator GLENN. Thank you very much, gentlemen.

I do have some questions here I would like to get into. You both, obviously, advocate the NRC assuming the coordinating role in this as well as the control role.

The way it was envisioned in this bill, and in the discussion of it here in previous testimony, the Commerce Department would coordinate all of the possible vetoes that other agencies might have, including NRC in the safety and the safeguards area. Looking at it in that regard, do you still have an objection to Commerce playing the same agency role which it plays with respect to almost everything else we export to foreign countries.

Mr. GREENBERG. It is unclear from the bill as drafted just what role Commerce will play. The licensing authority which NRC now has is being transferred completely to Commerce. That means that Commerce, at least under the current legislation, would have any authority that NRC has, under current law, to pass on health and safety and environment and so forth. It seems to me that this is clearly inappropriate because Commerce simply does not have any expertise to deal with these issues.

Senator GLENN. That was not intended. I think it was brought out quite forcefully yesterday in the testimony. Senator Percy focused on that problem for awhile during the questioning yesterday, as a matter of fact, and suggested that perhaps we need to change some of the wording in our markup on the bill or change the bill to reflect that.

We really did not look to Commerce as having all of the nuclear expertise to make these judgments and decisions on whether the physical security is or is not adequate or what is safe or is not safe with plutonium. This would be best left with NRC. Commerce was put in this to perform lead-agency functions with respect to the ministerial aspect of export controls.

As was pointed out yesterday, there are myriads of requirements under the regulations to be coordinated when a businessman tries to sell a plant abroad, and you are talking about a $1, $3, $5 billion a year income for the United States which is not a small thing to be considered.

So we do want to make the coordinating functions as easy as possible, but at the same time have safeguards in there so that we are not taking undue chances with respect to nuclear energy going abroad.

Would you see any objection to Commerce playing that type of role?

Mr. GREENBERG. Commerce has no substantive role whatsoever. It is only acting as a coordinator. The question to ask, I suppose, is how much greater efficiency is achieved in the system by having a coordinator outside of the agencies which are actually carrying on substantive reviews. The answer may be very little if we are dealing with the nuclear industry. That industry has had long experience in dealing with the AEC and will be dealing with NRC in the future as far as domestic licensing is concerned. So I do not think that there is any great advantage from the viewpoint of a businessman in the nuclear industry in dealing with Commerce.

Senator GLENN. I would think there might be some problem giving NRC that whole thing. They would then tend to become a big bureaucratic organization to administer all of this. All of us would like to see NRC become a streamlined, highly technical and very competent organization—keeping their efforts on that line—and not become a great bureaucracy.

Mr. GREENBERG. Again, it depends upon analyzing the efficiencies in the system. Our concern is: that because the Department of Commerce has been a promotional agency, its bias is going to be in favor of promoting nuclear exports. It is going to be putting pressure—if it is interested in this promotional aspect—on NRC and other regulatory agencies to move perhaps more quickly than they otherwise should.

Senator GLENN. You mentioned, as I understood it, that we can work to replace our own safeguards with international agreements. Are you saying that we could go back and reinvoke different safeguards at a later time?

Mr. GREENBERG. We do not believe that the United States should enter an international agreement which would foreclose its opportunity to later impose more stringent standards if it felt that such stringent standards were in the national interest.

Senator GLENN. Let me turn that around a little. Let's say that England, or let's say West Germany—well, let's say India. A scientist in India comes up with some new thing with regard to nuclear energy, and it is excellent, and we have not been able to get it. Then they want to sell it to us and we buy it. Do you think we would buy it on that same basis, so that they can come in and invoke safeguards later after we have spent maybe several hundred million dollars for a piece of equipment? It would all be bought and put into operation with the idea that India still had safeguards control over it, and then come in and invoke new standards on it.

Mr. GREENBERG. Would we buy it? It depends on how important we felt the particular equipment was. We are talking about countries which want to develop nuclear power. Those countries make a judgment as to how important nuclear power generating capacity is to them, and they are willing to accept safeguards. They are certainly willing to accept international safeguards. They may be willing to accept any number of further unilateral criteria which are required to be met by the United States.

I do not think you can automatically predict in advance what the reaction of a particular purchaser is going to be to a set of regulatory requirements, because that purchaser is going to make its own cost-benefit analysis.

Senator GLENN. I would think that would be very difficult to administer or to operate under that kind of a guideline in the conduct of international business, but maybe something can be worked out.

You mentioned that multilateral agreements among suppliers would be useful. Do you have any suggestions or any experience as to how such legislation might be worked out?

Mr. GREENBERG. I suggest in my prepared statement that one model for legislation which relates to U.S. unilateral controls to multilateral agreement is the Ports and Waterways Safety Act, enacted by Congress some 3 years ago, in an effort to pressure the international community to come up with standards regulating oil tanker design and construction.

There are problems with that statutory scheme, which I set forth in my written testimony, but I think it suggests a possible model for Congress taking action and by that action stimulating the international community to do something more than it has to date.

Senator GLENN. You mentioned that you were concerned about the absence of public hearings and Federal Register notices. Are other export license applications listed in the Federal Register? Do you know about this? I do not know.

Mr. GREENBERG. Chairman Glenn, even with regard to the nuclear export licensing process, applications for the export of nuclear power generating systems are publicly noted in the Federal Register. There is an opportunity for public participation now in those proceedings. However, when NRC considers applications for special nuclear material there is no public notice.

Senator GLENN. OK. That takes in another area then. The replacement of parts and equipment can now be licensed by the Department of Commerce and is signed off on it. There is no notice given of that type, I suppose, in the Federal Register. Some of those can be very vital.

Mr. GREENBERG. I think that is right. As far as I am aware, there is no notice with respect to such applications.

Senator GLENN. In your statement you say that two nations which do not have bilateral agreements for cooperation with the United States, Yugoslavia and Mexico, have been able to receive uranium from us nevertheless through the conduit of the IAEA.

As long as such things as that are not stopped are we ever going to be able to have control? What are your comments on that? How did this happen? I am not familiar with it.

Mr. GREENBERG. This came about through an amendment to the Atomic Energy Act of 1954 which was approved at the last session of Congress. That amendment allows shipments through the conduit of the IAEA for power purposes if the foreign country has an agreement with the IAEA, and if the United States has an agreement with the IAEA.

As I understand it, neither Yugoslavia or Mexico, for variety of political reasons, were willing to enter into a direct bilateral agreement with the United States. Thus, the Atomic Energy Commission came up with the alternative of using the IAEA as an intermediary.

The problem with that approach is that, in the absence of a bilateral agreement, there is no direct control by the United States over what the foreign purchaser does with nuclear equipment, technology and fuels.

Senator GLENN. Why did they refuse to enter into an agreement? Do you know why?

Mr. GREENBERG. I am not familiar with the facts of the particular negotiations.

Senator GLENN. Let's keep on IAEA for just a moment here. Mainly, IAEA has been used for sort of inventory information so far and has not really exercised physical control as such.

From your testimony I gather that you would like more international control as such. Is that correct?

Mr. GREENBERG. Well, I am at least suggesting that international physical security standards might be set by an international agency and required to be met by individual nations.

Senator GLENN. Let me put it more directly. Would you favor more physical control of plants, equipment, plutonium reprocessing by IAEA and giving up our soverign right, if you want to call it that, in this area to an international organization?

Mr. GREENBERG. The United States is in a somewhat different position than other countries, insofar as we are a weapons state, and thus the problem of national diversion at least is not a problem which we have. We are in a very different position than Singapore or the Philippines or some other country.

I think the problem of physical security is a very difficult one. It may be that no nation will be willing to accept foreign inspectors, whether they be the U.S. inspectors or international IAEA inspectors, on its soil.

Senator GLENN. We can do it better with IAEA in a control function like that, as opposed to our own people in this role, in view of the fact that we do control most of the enriched uranium and have controlled the bulk of the equipment to date on international markets. Would you feel better turning that over to the United Nations and voting all sorts of things when things go out of hand and out of control in other areas? Would you feel better with our own people, our NRC, our own safeguard system, which is set up and used to apply these stringent rules to other nations we sell to, and hoping that you get Mexico and some of the nonagreed to nations to do the same thing? Would you feel better turning that over to an international agency?

Mr. GREENBERG. No, I think that in an ideal world international solutions are better. I think that if, in the real world, the international solutions are not adequate—not adequate by our own lights—then we cannot turn it over to the IAEA. That is the point that I would like to make very strongly.

Senator GLENN. I am just about to come back to your other statement of not going with international standards that were lesser standards than ours.

Mr. GREENBERG. That is right.

Senator GLENN. All right.

Mr. GREENBERG. In the area of physical security, I just do not know whether it is practical to station U.S. Marines at every foreign reprocessing plant or fabrication plant. I don't know whether such an approach is politically possible or whether it is even an alternative that should be considered. That does not mean, however, that foreign recipients of U.S. nuclear power, equipment and fuels should not be required to provide their own physical security, subject perhaps to periodic inspection by the United States and subject to review of the overall plans by the U.S. regulatory authorities.

Senator GLENN. Mr. Knight, you are working with environmental groups. I know you must have contact with some groups similar in other countries.

Mr. KNIGHT. Yes, we do. We have 12 Friends of the Earth in other nations across the globe.

Senator GLENN. Would the other environmental or national interest groups in other countries—do you think that they would rather see us retain strict safeguards in this country since we are the world's major nuclear supplier or would they rather see us go to an organization such as IAEA with more stringent international controls and lessening our own controls over nuclear exports?

Mr. KNIGHT. I cannot answer for them. I think that inherent in any international agreement is, you know, the voluntary relinquishment of certain rights. I think in most international agreements of this type, there would be the voluntary acquiescence to certain safeguards. But the major burden for meeting those safeguards would still be with the member state. I do not really think in current political situations of the world that anything more would occur.

I think the idea of an international agency with real substantive power is just not a possibility. It has not happened elsewhere. It has not happened with the tanker standards. It has not happened on something like regulating fisheries or the taking of whales. It is still voluntary.

Senator GLENN. The Senator from Illinois.

Senator PERCY. Thank you very much, Mr. Chairman.

First: I would like to report to you that all is well in Cincinnati, Ohio, at least it was this morning when I left. I want to deliver you a personal greeting from the "Women's Club of Ohio" of their annual convention.

Mr. Greenberg, were you in the hearing room yesterday when witnesses appeared?

Mr. GREENBERG. No; I was not.

Senator PERCY. Did you get a report on their testimony or did you see some of the testimony?

Mr. GREENBERG. I saw some of it, but I did not have an opportunity to get a full report on the testimony.

Senator PERCY. Your own testimony this morning is refreshing in several standpoints. First, I think it is very unusual—or it is an extraordinarily good practice to have this summary at the beginning of the testimony.

Mr. GREENBERG. Thank you.

Senator PERCY. It is very helpful to us—particularly this morning, when we all have other hearings and we have to bounce around.

Second, the discussion came up yesterday as to whether, in essence, the pages of testimony we have from the Administration saying, in summary, "everything is all right; don't worry about it; things are very well; we have gotten things well in hand." But is this correct in the world in which we live?

Taking that as an accurate summation of some of the testimony we heard yesterday, would you challenge that? Could you express in your own words the depth of your concern about the present situation?

Mr. GREENBERG. As I started my testimony this morning, all of the groups which I represent are seriously concerned about the risks which nuclear power poses. Those are not just safeguards risks. They are risks associated with our lack of scientific knowledge as to how manage wastes and lack of knowledge as to whether nuclear power plants are truly safe. I think, moreover, that it is a fairly accurate evaluation of world politics to state that there are many countries which are unstable, which are subject to terrorist activity, and in which nuclear facilities or trains or trucks carrying plutonium or U-233 or highly enriched uranium pose very attractive targets for terrorists.

We have not yet seen terrorist activity focusing on nuclear power facilities or nuclear fuel. But I think that, if the nuclear industry continues to grow without adequate safeguards, occurrences of that sort are almost inevitable. Senator Ribicoff, in his opening statement on the 15th of April, referred to the millions of pounds of plutonium which are going to be loose in the world in the year 2000 if current projections are correct. Plutonium, as this committee knows, is the most toxic substance which we have in the world. A few grams of that substance are sufficient to cause cancer in many hundreds of thousands of individuals.

A plutonium dispersal device put into the air conditioning system of a major building, such as the World Trade Center, by a terrorist group would have unimaginable consequences. Moreover, as a number of experts, including Theodore Taylor and Mason Willrich, have stated—and I am not an expert on the possibility of building bombs—it may be relatively easy for a terrorist group with a certain degree of scientific competence to build a crude atomic weapon and detonate it with effects which would obviously be horrifying.

So I think we are on the verge now of a world which holds great dangers. Those risks which we foresee are going to grow unless something is done now to bring them under control.

Senator PERCY. I would like to ask you another question in general terms, but I will precede it by stating that my State of Illinois probably has more nuclear installations than any other State. They are dependent on nuclear power now more than any other State. We probably have amassed more research. The first chain reaction took place on this stag field in the grandstand there and we have Argonne and Arcadia.

We are in the nuclear age now. I have reported all of the research. I have reported the expansion and cautiously and carefully have chose some sites. I have always wanted to take environmental conditions into account. I have benefitted tremendously by some of the organizations that you have served and have help write legislative history.

But I am convinced that nuclear energy is here to stay and that we need it.

You represent 275,000 members. In some people's minds they represent sort of a radical element. They are just opposed to nuclear energy in any and all forms. They are using every device they can to throw road blocks in the way, to throw sand in the gears, to slow the process up until we are going to have an acute energy crisis as a result of all of this delay.

In view of that feeling by some people, I would like to give you, as representative of these organizations, the opportunity to state in the broadest possible terms as to whether or not you are here just for more regulations or more tightening down in order to block progress to the area; or whether your position is one of caution, of safeguard of prudence, but that you recognize we are in a nuclear age and, if carried on in the right way, you are not an opponent as such, nor are your organizations of nuclear energy.

I do not see in your statement your broadest possible position. I would like to give you a chance to put on the record your attitude, if you can express one, either for the organizations that you represent or your own opinion.

Mr. GREENBERG. As far as the five organizations that I represent, I am not authorized this morning to speak in such broad terms on their behalf.

Senator PERCY. Give us your personal opinion before I put specific questions to you on your testimony.

Mr. GREENBERG. I do not know what my personal judgments are worth. I am very concerned about the growth of nuclear energy. I think that I would agree with you that it is unlikely that the nuclear power industry is going to disappear. I think it is here. If it is here, that means that we are going to have to take all such steps as are necessary to begin to eliminate or reduce the risks, and the very real risks, which are associated with it.

Senator PERCY. You are not opposing any and all extension of nuclear power in this country and abroad. You recognize realistically it is here to stay. But you are focusing your attention on the safeguard aspect of it?

Mr. GREENBERG. I am today, but I must——

Senator PERCY. I have a feeling that if you could do away with it totally and completely you would like to.

Mr. **Greenberg**. I think, again, if we were talking about an ideal world, it might not be a bad idea. The problem that I have with nuclear power is that I am not satisfied in my own mind that the risks which I perceive are acceptable risks. I think in a variety of areas, such as waste management or safety, we do not have all of the answers. In light of the fact that we do not have all of those answers, I am concerned that we may be taking risks which will in the long run, turn out to be unacceptable to society.

But I must repeat, I am not speaking for the five groups which I represent in this regard. I think it is fair to say they have rather different views with regard to nuclear power in this country. Sometimes it is stated that environmentalists represent a unitary position aimed at blocking off further development. This is not the fact. The environmental community is as complicated and differentiated as any other segment of interest groups in our society. Among the five groups which I represent, there may be widely different views with regard to the advisability of proceeding with nuclear power development. What I tried to do today is bring them together on this issue.

Senator **Percy**. Mr. Greenberg, I have just been notified that the Foreign Relations Committee has now suspended testimony of witnesses until I get there. The hearing is on a piece of legislation that I am sponsoring.

I have asked all of the preliminary questions to the specific testimony to get a basis of that testimony.

Senator Glenn, considering I represented you in Ohio, I wonder if you would not mind asking these questions so that the record can be clarified?

Senator **Glenn**. All right.

Senator **Percy**. Thank you, Mr. Greenberg. I certainly do appreciate you being here, and your judgment is extraordinarily helpful to us. We have a very high regard for the organizations which you represent.

Senator **Glenn**. I will proceed with the questions Senator Percy has given to me.

On page 8 you stated the ERDA interim analysis dated April 7 reveals that at least some of the agencies involved in the export process still hold a somewhat Pollyannish picture of the risk of world growth and the peaceful nuclear power.

He says that he is interested in this because he has found some of the agencies to be a bit like Pollyanna. What is this ERDA interim analysis? What does it tell us about the shortcomings of our present system?

Mr. **Greenberg**. For better or for worse I struck the word Pollyannish from my final written statement, which will be incorporated in the record. However, the thought behind that statement still remains.

The ERDA interim analysis is an analysis which has been prepared as a result of a lawsuit which four of the groups which I represent brought in October 1973, to compel the Atomic Energy Commission and other responsible agencies to prepare an environmental impact statement on our nuclear power export programs. That impact statement has not yet been released. But, as part of the overall environmental review, ERDA undertook to analyze whether it would be appropriate to continue with nuclear power export activities in the interim.

The analysis which was released on April 7, and which is now open for public comment, concludes that it is appropriate to proceed on a business-as-usual basis with all of our nuclear power export activities and, indeed, does not differentiate between the risks which are posed, for example, by the sale or transfer of enriched nuclear fuel to Korea, as compared with the sale or transfer of enriched nuclear fuel to Switzerland.

The entire analysis is pervaded with the belief that nuclear power exports are substantially beneficial to this country and with very little recognition of the broad range of risks which are associated with such exports.

We are in the process of preparing detailed comments on this analysis. I would like, with the permission of the committee, to append those comments to my written statement when they are prepared.

Senator GLENN. Fine.

[The information referred to and subsequently supplied follows:]

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5 May 1975

Mr. W. H. Pennington
Office of the Assistant Administrator
for Environment and Safety
United States Energy Research and
Development Administration
Washington, D.C. 20545

International Nuclear Power Program

Dear Mr. Pennington:

We are writing on behalf of the Sierra Club, the Environmental Defense Fund ("EDF"), the National Parks and Conservation Association ("NPCA"), the Natural Resources Defense Council ("NRDC"), and Friends of the Earth ("FOE") to present their comments regarding the "Proposed Findings Supporting Determination Related to International Nuclear Power Export Activities Pending Preparation of a Section 102(2)(C) NEPA Environmental Statement" (the "Proposed Findings"), released by the United States Energy Research and Development Administration ("ERDA") on April 7, 1975 (40 Fed. Reg. 15438). We have acted as counsel for all the groups (except FOE) in the litigation which led to the decision to prepare the environmental impact statement (the "Programmatic Statement") on the international nuclear power program (the "program") (Sierra Club, et al. v. United States Atomic Energy Commission, et al., D.D.C., Civil Action No. 1867-73), and we have been asked by them to coordinate the presentation of their comments.

The environmental groups are all non-profit membership organizations deeply concerned and knowledgeable about the environmental consequences of fission power. Their combined membership exceeds 275,000 persons throughout the United States and abroad. 1/ They have taken an active role in the public debate surrounding the growth of commercial nuclear power by means of litigation, testimony, comments to regulatory bodies, and informational and educational programs designed to provide the public with data relevant to environmental issues posed by fission power development and to stimulate informed public discussion with respect to such issues. And, in particular, they have been concerned with the international environmental implications of the spread of fission power as an energy source.

1/ The Sierra Club, whose principal place of business is at 220 Bush Street, San Francisco, CA 94104, has a membership of approximately 150,000 persons, including persons residing in 67 foreign countries. EDF, whose principal place of business is 162 Old Town Road, East Setauket, NY 11733, has a membership of approximately 57,000 persons and a 700-member Scientists' Advisory Committee, including members residing in 18 foreign countries. NPCA, whose principal office is 1701 18th Street, N.W., Washington, DC 20009, has a membership of approximately 45,000 persons, including members residing in 36 foreign countries. NRDC, whose principal office is at 15 West 44th Street, New York, NY 10035, and which has additional offices in Washington, DC and Palo Alto, CA, has a membership of approximately 20,000 persons, including members residing in 8 foreign countries. FOE, whose principal place of business is 529 Commercial Street, San Francisco, CA 94111, has a membership of 20,000 persons and is affiliated with "sister organizations" in 12 foreign countries.

In the comments which we submitted to the Atomic Energy Commission (the "AEC") last summer presenting suggestions for consideration in connection with the preparation of the Programmatic Statement 2/, we stressed the importance of ERDA's endeavor and the need for a comprehensive analysis "treating all aspects of federal agency action to authorize, assist, support, and encourage the export of fission power generating systems and nuclear fuels." The Proposed Determination and Proposed Findings released on April 7 -- the first formal documents released as part of ERDA's overall NEPA review -- do not live up to this challenge. Indeed, as set forth below, the Proposed Findings are fundamentally inadequate in at least five basic categories of analysis: they fail to deal with certain key aspects of program activities, including most importantly, the environmental impacts of actions taking place abroad; they do not adequately assess the risks associated with individual program activities; they do not consider alternatives for the interim period short of a total "moratorium"; they do not realistically examine the ways in which program options may be foreclosed or irretrievable commitments made by taking interim actions; and they do not properly analyze the effect on the public interest of slowing

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2/ Letter, dated August 15, 1974, from Eldon V. C. Greenberg and Richard A. Frank to Dr. James L. Liverman, Assistant General Manager for Biomedical and Environmental Research and Safety Programs of the AEC.

down, modifying, or deferring export activities, in particular, the public benefits which might be achieved thereby. In such circumstances, the Proposed Findings cannot be relied upon as a basis for determining whether, and, if so, how to continue with program activities during the interim period. [3]

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[3] Before proceeding to discuss the specific substantive deficiencies in the Proposed Findings, a word should be said about the date chosen for commencement of the interim period itself. In our view, the proper operative date for commencing the interim period is not July 1, 1974, but rather March 15, 1974. It was on this latter date, through letter of counsel, that the AEC declared its intention to prepare the Programmatic Statement. Since March 15 represents the date the AEC made public its decision to subject program actions to environmental review, logic and reason require that all subsequent actions be regarded as interim in nature.

I. The Scope of the Proposed Findings is Unduly Narrow.

The Proposed Findings do not deal with a number of critical aspects of United States nuclear export activities. First, ERDA has defined the geographic scope of its analysis so as not to deal with environmental impacts of activities occurring in foreign countries. Second, although agencies other than ERDA and the Nuclear Regulatory Commission ("NRC") have an important role to play in the nuclear export process, the Proposed Findings, for the most part, ignore their roles and thus the range of actions and options under consideration is not related to the full scope of the export process. Third, certain classes of actions, such as the importation of plutonium for fabrication in the United States, the export of highly enriched uranium for use in research reactors, and the approval of technology transfers, are not discussed at all.

(a) Failure to Analyze Environmental Impacts of Activities Occurring Outside the United States -- Although ERDA states that its Proposed Determination will be based, *inter alia*, on the consideration whether "continuation of international nuclear power export activities during the prospective review period will give rise to a significant adverse impact on *the environment*" (emphasis added), the conclusions it reaches are not based on an evaluation of impacts on "the environment" but on the environment "in the United States and on the high seas" (2) 4/ And, even these impacts are only considered if they are related to "activities... conducted within the United States and on the high seas" (2). Thus, not only has ERDA determined not to evaluate impacts occurring in foreign countries, but it has also determined not to examine impacts within the United States which might be associated with activities conducted abroad. 5/ Such an approach makes sense neither as a matter of law or logic.

4/ Numbers in parentheses are page references to the Proposed Findings.

5/ Ironically, ERDA is willing to consider certain non-environmental impacts occurring in foreign jurisdiction when it suits its purposes. Thus, for example, when ERDA discusses the effect on the public interest of a "moratorium" on nuclear power export activities (119-126), it considers the impact of a "moratorium" on an importing country's ability to produce nuclear power (120-121), and the cost to foreign customers of substituting fossil fuel generating capacity for inoperative nuclear generating capacity (122). If these economic interests of foreign countries may be taken into account by ERDA, the environmental impacts of actions taking place within such countries must also be considered.

It is not our purpose in this letter to spell out in detail the legal authority which compels the conclusion that National Environmental Policy Act of 1969 ("NEPA") requires federal agencies to consider all environmental impacts of actions which they take in foreign countries. These arguments are set forth fully in the plaintiffs' papers filed last spring in Sierra Club, et al. v. United States Atomic Energy Commission, et al. [6] It must be emphasized, however, that the position taken by ERDA with regard to the scope of NEPA has been rejected by virtually every commentator who has addressed the subject. See, e.g., Legal Advisory Committee Report to the President's Council on Environmental Quality (December, 1971); Committee on Environmental Law of the Section on International and Comparative Law of the American Bar Association, Opinion on the International Scope of NEPA (July, 1971); Strausberg, The National Environmental Policy Act and the Agency for International Development, 7 International Lawyer 46 (1972); Robinson, Extraterritorial Environmental Protection Obligations of Foreign Affairs Agencies: The Unfulfilled Mandate of NEPA, 7 International Law and Politics 257 (1974).

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[6] See Memorandum of Points and Authorities in Opposition to Defendant Export-Import Bank of the United States' Motion for Summary Judgment and In Support of Plaintiffs' Cross-Motion for Summary Judgment, pp. 30-51, dated April 24, 1974, and the Reply Memorandum of Points and Authorities in Support of Plaintiffs' Cross-Motion for Summary Judgment, pp. 14-19, dated June 3, 1974, in Sierra Club, et al. v. United States Atomic Energy Commission, et al., Civil Action No. 1867-73 (D.D.C.).

Significantly, moreover, the House Committee on Merchant Marine and Fisheries, after carefully considering the proposition that activities conducted in foreign jurisdictions are not covered by NEPA, specifically stated in its Report on NEPA oversight hearings held in 1970:

> "The Department of State, in consultation with CEQ, should reconsider its position that AID supported projects need not be accompanied by '102' statements. Such a position is contrary both to the language of and to the intent of NEPA."
> "Administration of the National Environmental Policy Act," H.R. Rep. No. 92-316, Report by the House Committee on Merchant Marine and Fisheries, 92d Cong., 1st Sess. 6 (1971).

Commenting further on the view that Section 102 does not require preparation of environmental impact statements with regard to foreign programs, the Committee concluded:

> "Stated most charitably, the Committee disagrees with this interpretation of NEPA. The history of the Act makes it quite clear that the global effects of environmental decisions are inevitably a part of the decision-making process and *must be considered in that context*." *Id.* at 33 (Emphasis in original).

Finally, and perhaps most importantly as far as ERDA's responsibilities are concerned, the Council on Environmental Quality (the "CEQ") has called upon agencies to consider the impacts of their actions in "both the national and international environment." 40 C.F.R. §1500.8(a)(iii)(A).[7] Such views must be given great weight by the agency. *Warm Springs Dam Task Force* v. *Gribble*, 94 S.Ct. 2542 (1974).

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[7] The CEQ has, in particular cases, urged the preparation of impact statements on agency actions taking place outside the U.S. See, *e.g.*, letter, dated February 6, 1973, from Russell E. Train, Chairman of CEQ, to Dr. John A. Hannah, Administrator of the Agency of International Development, attached As Exhibit A to the Complaint in *Environmental Defense Fund, Inc., et al.* v. *United States Agency for International Development, et al.*, D.D.C., Civil Action No. 75-0500 (filed April 8, 1975).

The failure to consider the environmental impacts of actions occurring in foreign jurisdictions results in a hopelessly limited analysis. While impacts of actions occurring in the United States, such as those associated with the enrichment of fuel for foreign use or the potential reprocessing and waste storage of spent foreign fuel, are important, nonetheless they are only part of the overall fuel cycle, and, in examining the environmental impact of program activities, they cannot be isolated from impacts associated with other steps in the fuel cycle, which may occur abroad.[8/] "NEPA mandates a rather finely tuned and 'systematic' balancing analysis...," Calvert Cliffs' Coordinating Comm., Inc. v. Atomic Energy Commission, 449 F.2d 1109, 1114 (D.C. Cir. 1971), and "all known possible environmental consequences of proposed agency action", Environmental Defense Fund v. Corps of Engineers, 325 F. Supp. 749, 759 (E.D. Ark. 1971), must be fully assessed if this balancing process is to be rationally carried out. The approach taken by ERDA makes it impossible to do so, and indeed, amounts to a bald assertion that it is wholly irrelevant to the U.S. decisionmakers (and other affected persons) whether the construction and operation of U.S. supplied nuclear power generating systems and the use, transport and management of nuclear fuels and associated radioactive wastes, result in catastrophic environmental consequences, so long as such activities take place abroad. This amounts to nothing less than an

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[8/] See generally our letter of August 15, 1974 to Dr. Liverman, Note 2, supra, concerning the impacts of export activities outside the United States which should be considered in any NEPA analysis of the program.

abdication of environmental responsibility under NEPA. 9/

Even assuming arguendo that NEPA's scope does not extend to impacts of federal agency actions when such impacts occur in a foreign jurisdiction, it must necessarily cover impacts associated with such actions, even actions conducted abroad, which occur on the high seas or in the United States. There is no justification for ERDA's failure to consider in the Proposed Findings potential direct effects on U.S. citizens -- persons who clearly fall within the scope of NEPA's protection.

9/ It should be pointed out that a corollary of ERDA's refusal to consider only impacts of activities conducted within the U.S. or on the high seas is its apparent decision to consider in the Programmatic Statement only "alternatives within the domestic nuclear fuel cycle" (110). In other words, the full range of alternatives which could affect program activities, including alternatives available to U.S. agencies, foreign governments, and intergovernmental bodies, -- a range of alternatives required to be considered under NEPA, see Natural Resources Defense Council, Inc. v. Morton, 458 F. 2d 827 (D.C. Cir. 1972) -- will be unjustifiably ignored.

For example, might not the meltdown of the reactor core of the Laguna Verde-2 generating system, to be located in Vera Cruz, Mexico (presumably on the Gulf of Mexico) (37), with a major release of radioactive gases and liquids into the environment, have an impact beyond the territorial jurisdiction of the government of Mexico or ultimately on the United States? Similarly, if low-level or high-level wastes resulting from the use of enriched nuclear fuel shipped to Japan (40-42) are dumped by the Japanese in the ocean, might there not be impacts on the high seas of such actions, even ultimately affecting the United States? 10/ These and other similar questions must be answered if the Proposed Findings are to provide a complete and accurate picture of the risks posed by interim program activities.

10/ In addition to impacts associated with individual actions, aggregate impacts should also be assessed on a worldwide basis -- as they are for activities taking place within the United States (43-90) -- in order that global risks of interim actions (and thus necessarily risks to the U.S. environment) are fully presented in the Proposed Findings.

(b) Failure to Consider Actions of Other Responsible Agencies -- In acting as the lead agency in preparation of the Programmatic Statement, it is ERDA's responsibility, as Judge Gasch emphasized in his opinion of August 2, 1974, in Sierra Club, et al. v. United States Atomic Energy Commission, et al., 6 E.R.C. 1890 (D.D.C., August 2, 1974), to insure that relevant actions of all federal agencies involved in the export process are appropriately evaluated and considered under NEPA. ERDA, however, has failed to shoulder this responsibility.

The most egregious omission from the Proposed Findings is any discussion of the role of the Export-Import Bank of the United States ("Eximbank") in the nuclear export process. From a reading of the Proposed Findings, one would have no idea that financing by a U.S. agency had anything to do with the export of nuclear equipment, technology and fuels. Yet, as we have stressed on numerous occasions, financing of nuclear power exports by Eximbank plays an important role in the program. Indeed, in many cases, exports depend upon availability of financing from Eximbank. As of December 31, 1973, Eximbank financing had been or was being provided for 70% of all U.S.-built nuclear power plants exported or expected to be exported at such date, while Eximbank financing had been provided for more than 35% of the AEC's fuel enrichment service contracts. 11/ And proposed Eximbank financing commitments in the interim period have generated substantial public controversy. 12/ Obviously, financial commitments involving interim actions and their effects on the overall NEPA process must be reflected in the Proposed Findings.

Agencies other than Eximbank also have a role to play in the overall export process, but the nature and scope of their actions during the interim period are basically ignored in the Proposed Findings. For example, although the Proposed Findings state that the Department of Commerce is responsible for issuing export clearances for equipment and facilities which "do not constitute a reactor or a major component thereof" (34), there is no further reference in the Proposed Findings to the Department of Commerce's role in the nuclear export process. In introducing a bill to restructure

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11/ See Eximbank's and the AEC's Answers to Interrogatories, dated February 15, 1974, in Sierra Club, et al. v. United States Atomic Energy Commission, et al. (D.D.C., Civil Action No. 1867-73).

12/ See, *e.g.*, Statements of Senator Stevenson (D-Ill.) concerning a proposed loan for the export of a 600 MWe nuclar power generating system to South Korea. 121 *Cong. Rec.* S.3364 (daily ed., March 7, 1975); 121 *Cong. Rec.* S.3598 (daily ed., March 11, 1975).

the U.S. export licensing process (S.1439), Senator Ribicoff (D.-Conn.) recently stated:

> "[N]uclear components now comprise the major share of our nuclear exports, reflecting a shift away from the sale of complete reactors and toward the sale of technology, such as blueprints, and the complex subassemblies that other nations cannot produce themselves." 13/

In light of the apparent importance of the Department of Commerce's role, clearly the Proposed Findings should address such questions as: What procedural and substantive requirements are followed by the Department of Commerce in evaluating clearance applications? How many applications for clearance does the Department of Commerce receive each year? What is the nature of the equipment and facilities which it issues clearances for? Could the export of any such items have a significant environmental impact or foreclose later options?

(c) Failure to Discuss Significant Classes of Actions -- The Proposed Findings fail to discuss certain classes of actions which have been or may be undertaken in the interim period which may have a significant environmental impact. These include the issuance of licenses for the importation into the United States of special nuclear material, particularly plutonium, and radioactive wastes; the issuance of licenses for the export from this country of special nuclear material for use in research programs; and the

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13/ 121 Cong. Rec. S.9961 (daily ed., April 15, 1975).

authorization of the transfer of U.S. technology. 14/

Although the Proposed Findings state that "no U.S. nor foreign reprocessing capability is expected to be available until at least 1976" and that "consequently, neither reprocessing in the United States of nuclear power reactor fuels from abroad nor related waste disposal activities are considered in this interim analysis" (8), this statement might be taken to imply that fuel reprocessed abroad has not been or will not be shipped to the United States. 15/ However, in the past, at least, commercial reprocessing facilities have been operational in several locations abroad, including Mol in Belgium, and Windscale in Great Britain. And, during the interim period, plutonium, recovered from the Trino reactor in Italy and reprocessed by Eurochemic in Mol, Belgium, has

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14/ It should also be mentioned that certain types of actions referred to in the Proposed Findings, such as the U.S. German-Offset Agreement of 1975 (50, 116) and the export of highly enriched uranium for use in high temperature gas-cooled reactors (93-95, 107), are not explained in sufficient detail so as to allow the reader to understand their relationship to other program activities. For example, how and why were the agreements providing for transactions negotiated, and are they precedents for other, future agreements of the same type?

15/ This statement also implies that no commitments are being made now with respect to future reprocessing and waste disposal activities in the United States. The Proposed Findings should expressly indicate whether such commitments have been or may be made; if they have, their nature and implications should be described; and, if they have not, any other plans which exist for reprocessing and waste disposal should be discussed.

been shipped to the United States for fabrication by Westinghouse Electric Corporation in Cheswick, Pennsylvania. 16/ Such shipments have generated substantial public controversy. 17/ Clearly, then, if not dealt with in a separate environmental impact statement 18/, reprocessing abroad, with subsequent importation of plutonium into the United States for fabrication -- a step in the fuel cycle which involves direct and immediate risk of environmental injury to the United States -- is something that must be considered both in the Proposed Findings and in the Programmatic Statement.

The Proposed Findings further specifically state that they do not include exports for "nuclear energy research and development" (2). As has recently been made public, the United States has, during the interim period, shipped strategically significant quantities of highly enriched uranium to South Africa for use in its research reactor program 19/, and such

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16/ See United States Atomic Energy Commission Docket No. 70-168, Concerning License No. SNM-1468. The footnote at page 3 of the Proposed Findings dismissing such import licenses as not "part of the ongoing nuclear power export program" is totally beside the point. Individual import licenses may pose a direct risk to the United States environment, and, once a license is issued, the action becomes, for all intents and purposes, irreversible. It is thus essential to determine in advance whether the action should be permitted at all pending completion of a full environmental analysis. It may be that a separate impact statement is the best vehicle to address this problem, see letter dated April 3, 1975, from Lee V. Gossick, Executive Director for Operations of NRC, to Mr. George F. Murphy, Executive Director of the Joint Committee on Atomic Energy, but if that is the case, it should be explicitly stated in the Proposed Findings.

17/ See, *e.g.*, the *New York Times*, March 29, 1975, at 22, col. 1 (editorial).

18/ See Note 16, *supra*.

19/ See the *Washington Post*, April 14, 1975, at A1, col. 4.

shipments have been a cause of public concern. 20/ Because of the significant risks which may be involved in such exports, at the very least, if a decision is made that the Programmatic Statement is not an appropriate vehicle to deal with the research export problem, then a concommitant decision must be made (and appropriately noted in ERDA's ultimate findings) to prepare an environmental impact statement covering such problem.

Finally, the Proposed Findings in no way deal with or even mention actions of ERDA or other agencies relating to the export of technology by U.S. corporations (e.g., licensing of patents, know-how, etc.). 21/ Technology transfers have permitted the development abroad of large scale nuclear power industries, in countries such as France 22/, and recently proposals have been made in Congress to strengthen controls over such transfers. 23/ Because of the importance of technology transfers as a basis for expanding civilian nuclear power programs, it seems essential to analyze this aspect of the program in the Proposed Findings.

20/ See, e.g., Hearings before the Senate Government Operations Committee on the Export Reorganization Act of 1975, S.1439, 94th Cong., 1st Sess. (April 24, 1975)

21/ See generally 10 C.F.R. Part 110 (Supp. 1974).

22/ See "Exports of Nuclear Materials and Technology", Hearings before the Subcommittee on International Finance of the Senate Committee on Banking, Housing and Urban Affairs, 93d Cong., 2d Sess. 10-11, 28-31 (1974).

23/ See Hearings before the Senate Committee on Government Operations on the Export Reorganization Act of 1975, S.1439, 94th Cong., 1st Sess. (April 24, 30, May 1, 1975).

II. The Proposed Findings Do Not Adequately Assess the Risks Associated with Individual Program Activities

In a letter to us, dated November 11, 1974, Marcus Rowden, General Counsel of the AEC, stated that the Proposed Findings would "involve an assessment of each individual action" in the context of the four issues dealt with therein. 24/ The Proposed Findings do not fulfill this commitment. Although they contain certain data concerning nuclear power development plans in particular countries and United States agreements with or commitments to such countries, they contain no analysis of the particular risks, on a project by project or even country by country basis, associated with nuclear power development activities taking place abroad. To some extent, of course, the lack of such analysis is a function of ERDA's decision not to deal at all with activities in foreign countries. See Point I(a), *supra*. But even as far as individual program activities in the United States are concerned, the analysis is presented in such a way that it is impossible for the reader to understand the environmental implications of such activities, for virtually no attention is given to the harm they cause, their absolute

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24/ Exhibit C to the Affidavit of Eldon V. C. Greenberg, sworn to March 21, 1975, in *Sierra Club, et al.* v. *United States Atomic Energy Commission, et al.*

as opposed to comparative effects, or the specific geographic locations in which their impacts might occur. 25/ Such an approach is inconsistent with the mandate of NEPA, and, indeed, even with the approach taken by the AEC in previous interim analyses, such as that of the Liquid Metal Fast Breeder Reactor

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25/ In order to assess properly the risks of potential adverse impacts occurring, it should also be emphasized that the Proposed Findings must address, to a greater extent than they now do, the adequacy of current policies, practices and procedures for eliminating or reducing such risks. For example, in light of the fact that the United States has "recently instituted...[a] policy requiring that exports of highly enriched uranium be authorized only after the government of the recipient country has established physical security measures acceptable to the U.S. to prevent theft of the material or sabotage of related facilities by sub-national groups" (94), the question arises as to whether current policy, which does not require that any physical security standards be met governing plutonium recovered from spent fuel elements utilized in exported nuclear power generating systems, is adequate to protect against diversion, sabotage or theft at that stage of the fuel cycle. Indeed, does even a standard which calls for "acceptable" physical security measures insure that such measures will be "adequate" to prevent the theft or sabotage of special nuclear material by sub-national groups. Similarly, in light of the fact that "the U.S. material control and accounting system has been strengthened" in the past two years (100), what are the implications of this fact as it bears on the adequacy of the current international system, and are such implications consistent with ERDA's conclusion that "the IAEA safeguards system effectively meets the objective to detect and to deter national diversion of materials exported during the interim period" (104)? The issues of safeguarding special nuclear material are, along with other issues relating to the safety of nuclear power development, being increasingly intensely debated. See, e.g., Hearings before the Senate Government Operations Committee on the Export Reorganization Act of 1975, S.1439, 94th Cong., 1st Sess. (April 24, 30, May 1, 1975). A much harder and more realistic assessment of the adequacy of current safeguards, as well as other current regulations, practices and policies, must be provided in the Proposed Findings if they are to provide the decisionmakers and the interested public a complete and accurate picture of the risks posed by continuing, without alteration, nuclear export activities during the interim period.

Program. 26/

(a) Impacts of Activities Occurring Outside the United States -- Individualized examination of particular projects is the only way in which the required NEPA balancing determination 27/ can be adequately carried out. And, especially in dealing with the export of nuclear equipment, technology and fuels to a wide variety of countries, in which there are obviously very different conditions present, to make no individualized analysis of risks makes very little sense. Yet, in the Proposed Findings' discussion of safeguards (91-107) the one place in such document where there is at least an indication that risks related to activities conducted abroad may have some relevance to decisionmakers -- solely a generic analysis is provided.

With regard to safeguards issues, the Proposed Findings appear to recognize, at various points, that safeguards risks may vary from country to country. Thus, it is indicated that adherence to the Treaty on the Non-Proliferation of Nuclear Weapons (the "NPT") 28/ may be a factor taken into account in determining whether to execute and how to administer Agreements

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26/ See "Findings Supporting Determination in Regard to LMFBR Program Pending Preparation of a Section 102(2)(C) NEPA Impact Statement" (1974), in which the bulk of the analysis is devoted to discussing impacts of program activities at specific sites.

27/ See page 9, *supra*.

28/ Done at Washington, London and Moscow July 1, 1968; entered into force for the United States March 5, 1970, 21 U.S.T. 483, T.I.A.S. No. 6839.

for Cooperation (16, 29). 29/ Likewise, in discussing proposed Agreements for Cooperation with Egypt and Israel, the Proposed Findings note that "unique political and historical relationships", at least, may call for a modification of standard practices (28-29). And, in terms of safeguards risks, it is obviously not at all the same thing to permit the export of enriched nuclear fuels to South Korea, for example, a developing country engaged in a political struggle with Communist North Korea, and to permit exports to a stable, developed Western European country such as Switzerland. 30/ It seems clear, therefore, that it is encumbent upon ERDA to analyze specifically where and how exported nuclear fuels will be used in particular countries and what will be done with the fuels once spent, as well as the political climate in such countries as it bears upon the risk of diversion and/or theft or sabotage, if its assessment of safeguards risks is to contain something more than relatively useless generalizations. 31/

29/ It should be noted, in this regard, that many commentators have suggested that the United States should not permit the export of fission technology and fuels to nations which are not parties to the NPT. See, *e.g.*, testimony of Herbert Scoville before the Subcommittees on International Organizations and Movements and on the Near East and South Asia of the House Committee on Foreign Affairs, 93d Cong., 2d Sess. (June 25, 1974).

30/ Indeed, the pending nuclear fuel export license to South Korea (42) has evoked substantial public concern. See, *e.g.*, the *Washington Post*, April 18, 1975, at 2, col. 4

31/ Certainly, to the extent that individualized risks in foreign countries are analyzed, as they must be, see Part I(a), *supra*, risks other than safeguards associated with the particular projects, e.g., the major accident risk in a given location or the radiation risks to be public given the population density of an area proximate to a reactor site, must be dealt with as well. ERDA, NRC and other responsible agencies must have before them adequate data to ensure that commitments are not made without full understanding of the environmental risks involved.

(b) Impacts of Activities Occurring Within the United States -- The failure of ERDA to conduct a meaningful analysis of environmental impacts continues in the Proposed Findings' assessment of activities occurring within the United States (43-90). This entire discussion is little more than a mathematical extrapolation from aggregate analyses set out in the AEC's "Environmental Survey of the Nuclear Fuel Cycle," WASH-1248, issued in 1972, and attached as Appendix D to the Proposed Findings. ERDA's approach makes it effectively impossible for decisionmakers and the public to understand the impact of program activities for several reasons:

First, merely providing aggregate figures with respect to the amount of effluents attributable to all nuclear export activities (e.g., 74-82) or the percentage of effluents attributable to individual contracts (83-90) does not really help the reader understand what the environmental impact of such activities is. In order to do this, the effects of such effluents must be analyzed, as well as the cost which they inflict upon society. It is not meaningful, for example, merely to state that export activities will require 385 billion gallons of water in the interim period (54). That is merely the first step in the analysis. The next question is: What kind of impact does the use of this water have on the environment, and what costs are associated with its use? Answers to these questions are nowhere found in the Proposed Findings.

Second, the analysis provided by ERDA seems to be often used as a springboard for a comparison of incremental impacts of program activities with either total effluents from all domestic nuclear power activities or total effluents from other industries, which accomplishes the end result of trivializing program activities. For example, the Proposed Findings note the "trivial nature" of nonradiological gaseous effluents from export activities (59), the "minor portion" of the total releases of liquid effluents from export activities (62), the "insignificant" probability of a serious accident resulting in an accidental criticality event during transport of enriched uranium materials (70), etc. While such comparisons are instructive to some degree, not only do they not serve to demonstrate the "trivial nature" of impacts directly related to export activities, but they cannot serve as a basis for decisionmaking under NEPA. The question is not what the comparative impact of export activity is, but rather what the absolute impact is, partiuclarly in the specific locations in which such impacts will be felt.

Third, ERDA's analysis in no way permits the reader to understand who might be affected by impacts associated with interim actions or in what geographic locations such impacts would occur. If, for example, 90% of the exports and imports of special nuclear material passed through one or two ports of entry, this would be a very different situation, in terms of risk to a particular environment, from one in which such imports might pass through dozens of cities. Similarly, because all three United States gaseous diffusion enrichment plants are located in one part of the country, it seems clear that the incremental impact of enriching fuel for foreign users is particularly felt by residents of that region. These absolute and potentially significant localized effects are simply ignored in the Proposed Findings.

(c) Individual Impacts and the Need for Separate Environmental Impact Statements -- In his letter to us of November, 11, 1974, 32/ Marcus Rowden indicated that the possibility of preparing separate, environmental impact statements on proposed, interim actions was awaiting completion of the Proposed Findings. The failure of the Proposed Findings, however, to provide any understandable, differentiated risk analysis forecloses the opportunity of ERDA, NRC, and other agencies concerned with the interim review to determine whether separate environmental impact statements should be prepared with regard to particular transactions. Indeed, it is impossible to determine whether such statements would be appropriate based upon the data contained in the Proposed Findings. ERDA has thus disabled itself from fulfilling a commitment which is essential to the integrity of the overall NEPA process. 33/

32/ See Note 24, *supra*.

33/ This deficiency in the Proposed Findings is especially serious as regards the issuance of the license on October 24, 1974, for the export of the Laguna Verde-2 nuclear power generating system to be sited near Vera Cruz on the Gulf of Mexico (37). As we have stated in the past, see our letter of December 11, 1974, to Marcus Rowden, this transaction, which involves export for the first time to a country not party to a bilateral Agreement for Cooperation with the United States, may pose a potential threat to the North American environment, and deserves "the fullest possible consideration" in the Proposed Findings. Moreover, in his letter of December 24, 1974, to Robert Hallman and myself, see Appendix B to the Affidavit

[footnote continued on page 25]

III. The Proposed Findings Do Not Consider Alternatives Short of a Total Moratorium

In a letter to us dated December 24, 1974, Bertram H. Schur, Associate General Counsel of the AEC, stated that, "The purpose of the interim analysis is to determine, *inter alia*, whether, and to what extent, interim actions must be modified or made conditional ...." 34/ The approach which ERDA has taken in the Proposed Findings forecloses the possibility of taking any steps to modify or make conditional

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33/ continued from previous page

of Abraham S. Friedman, sworn to March 28, 1975, in *Sierra Club, et al.* v. *United States Atomic Energy Commission, et al.*, Bertram H. Schur, Associate General Counsel of the AEC, indicated to us that the Proposed Findings would consider the risks associated with this transaction. Their failure to do so is wholly inexplicable. Certainly, consideration must be given forthwith to the preparation of a separate environmental impact statement on this significant export license.

34/ Appendix B to the Affidavit of Abraham S. Friedman, sworn to March 28, 1975, in *Sierra Club, et al.* v. *United States Atomic Energy Commission, et al.*

interim actions. Indeed, ERDA has structured its analysis in such a way so as to present only two alternatives: continuing all program activities with no alteration or imposing a total "moratorium." This black and white analysis is completely unnecessary, for certainly there are less drastic alternatives, both substantive and procedural, available to the responsible agencies which might help ensure that non-redressable, environmental impacts do not occur and that future options are not foreclosed as far as particular transactions are concerned.

(a) Substantive Alternatives -- As regards substantive alternatives, a decision might be made in the interim period to differentiate between different classes of actions. For example, such a decision might involve deferral of entering into new commitments with countries which do not now have civilian nuclear power programs and/or which are not yet parties to the NPT. Contracting and licensing might go forward, however, with countries which are NPT parties and/or which have already embarked upon nuclear power programs. Adoption of this alternative would help ensure that new expectations and reliances are not built up which would make it more difficult in the future to terminate or modify program activities, but it would not interfere with existing contractual relationships or expectations.

Similarly, the United States might defer making new commitments with countries such as Mexico and Yugoslavia with which the United States has no direct bilateral agreement (13), but continue to make commitments with countries willing to deal directly with us. Under the proposed transactions with Mexico and Yugoslavia, sole reliance is placed on the International Atomic Energy Agency (the "IAEA") for ensuring safeguards, and, under current IAEA procedures, there is no way in which the United States can assure the physical sucurity of exported special nuclear material. 35/ Consequently, these transactions may significantly foreclose United States options in the future -- the United States, one nation standing alone, can scarcely force the IAEA to change its standards or establish

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35/ It should be pointed out that the discussion of the Yugoslavian and Mexican transactions, which represent a significant new departure in the regulatory structure of the program (see S. Rep. No. 94-8, 94th Cong., 1st Sess. (February 13, 1975)), receives only the most cursory treatment in the Proposed Findings (13). It is, however, certainly open to question whether it is appropriate to proceed with these new procedures, not fully evaluated under NEPA, until the final Programmatic Statement is issued. In any event, some attention must be given to the difference, in terms of U.S. control, between transactions which take place without a direct bilateral agreement between a foreign country and the United States and transactions which occur under the umbrella of such agreements.

physical security requirements. The alternative of rescinding such transactions or, at the very least, proposing no further transactions in which sole reliance is placed upon the IAEA for safeguarding special nuclear material, may therefore markedly increase the United States' flexibility to impose safeguards conditions, should they be deemed appropriate, on future exports. 36/

(b) Procedural Alternatives -- Even if it is determined that all program activities should proceed in the interiim period, nonetheless there appear to be procedural alternatives available to the responsible agencies which might eliminate or reduce the risks of foreclosing program options. Certainly, some consideration must be given in the Proposed Findings to the need for modifying or making conditional interim actions. As we suggested last December to the AEC,

> "[I]n order to avoid foreclosing objective consideration of options, including termination and/or modification of program actions,... the contingent nature of interim actions must be expressly acknowledged and discussed in the interim analysis. It must be made clear that all interim actions are conditional, i.e., subject to revocation or modification if such steps are deemed appropriate based on the results of the final environmental statement, and, the option of incorporating a specific provision to such effect in any interim agreements, contracts or licenses should be fully considered in the interim analysis." 37/

36/ It should be emphasized, of course, that alternatives such as this are open to and must be considered by Eximbank, the Department of Commerce, and other responsible agencies, as well as ERDA and NRC.

37/ Letter, dated December 11, 1974, from Eldon V. C. Greenberg and Robert M. Hallman to Marcus A. Rowden.

As is stated at various points in the Proposed Findings, the United States has broad authority "to impose specific conditions on any export license issued, such as requiring adequate physcial security measures in the recipient country, restrictions on the location of reprocessing plants and disposition of Pu produced in the fuel elements" (35). Given this apparent flexibility, we fail to understand why no consideration has been given to the possibility of specifically conditioning Agreements for Cooperation, fuel enrichment service contracts and licenses in the interim period so that all who deal with the United States will be fully aware that the commitments made are contingent, thus avoiding the possibility of future misunderstandings and unfulfilled expectations.

Finally, short of conditioning interim actions on the results of the final Programmatic Statement, certain procedural steps might be taken to help insure that appropriate public consideration is given to individual, interim actions as they are considered in the licensing or contracting process. As is apparent from reading the Proposed Findings, one glaring defect in NRC's current export licensing procedures is that no Federal Register notice is issued in connection with export or import licenses for special nuclear material (38). Thus, interested persons, unless they have the opportunity personally to examine NRC's docket, have no way of knowing when particular export or import license applications are under consideration or what such applications involve. Without undertaking a formal rule-making, NRC could alter its procedures now so as to provide for such public notice, thus increasing likelihood that public attention will be able to be focused on risks associated with individual licenses for the export or import of special nuclear material during the interim period. 38/ Procedural alternatives such as this should be considered in the Proposed Findings.

IV. The Proposed Findings Do Not Realistically Examine the Ways in Which Program Options May be Foreclosed as the Result of Taking Interim Actions

ERDA concludes that continuing program activities during the interim period should not "significantly foreclose" the ability of the U.S. to terminate or modify such activities after completion of a full NEPA review (118). This conclusion is unwarranted and substantially undercut by the constraints upon the United States' ability to do so arising out of interim commitments and the vagueness of ERDA's assurances that such legal ability will remain unimpaired. 39/

38/ It should be noted that NRC has already, in the interim period, taken certain other steps to ensure that greater consideration is given to individual export and import licenses. Thus, in April of this year, NRC shifted its procedures to provide for review by the full Commission of export and import licenses, although previously such licenses had only been reviewed by the staff. See the New York Times, April 23, 1975, at 5, col. 1.

39/ The vagueness of ERDA's assurances is illustrated by statements such as

> "The conclusion or amendment of Agreements for Cooperation during the interim period *generally* will not commit the ERDA to enter into uranium enrichment service contracts" (emphasis added) (111); or

[footnote continued on page 31]

The Proposed Findings recognize that , to the extent that "entering into Agreements for Cooperation during the interim period commits the United States to continued reliance on IAEA; the U.S. loses the ability to unilaterally impose different safeguards" (113); that approval of increased ceilings for shipments of enriched nuclear fuel to the IAEA commits ERDA to the fulfillment of enrichment contracts previously entered into with with Yugoslavia and Mexico (114); and that, "once exported pursuant to such [export] license,

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39/ continued from previous page

> "Although issuance of particular export licenses during the interim period will foreclose the ability of the United States to institute new conditions... other vehicles should generally be available to accomplish the objectives deemed necessary upon completion of the NEPA review" (emphasis added) (118).

Because it is not clear under just what circumstances future freedom of action will or will not exist, these statements provide no real guidance to the decisionmakers in assessing whether particular actions should be deferred or modified.

facilities and enriched uranium cease to be subject to the licensing authority" (117). It is further indicated that the "general obligation of the U.S. to act in good faith" under Agreements for Cooperation or enrichment service contracts places real constraints on the United States' ability to adopt subsequent regulatory alternatives (110, 112).40/ Yet, despite this recognition of the ways in which future options may be foreclosed, continuation of all program activities is justified in reliance on theoretical or hypothetical legal tools for later modifying or terminating such commitments, i.e., ERDA's unilateral right to void contractual obligations (115), the fact that fuel provided under enrichment service contracts is subject to issuance of an export license (115), and so forth. The problem with this analysis is that it never comes to grips with the legal realities of U.S. commitments, the likelihood that corrective action will be taken, or the practical impact of building up foreign expectations concerning the receipt of U.S. nuclear exports. 41/

40/ If adoption of a particular regulation, policy, or practice based upon an assessment of risks associated with the international nuclear power fuel cycle, raises questions of good faith compliance with Agreements for Cooperation or enrichment service contracts, then the foreclosure of U.S. options by taking such actions may be very significant indeed and obviously this risk is something which must be discussed in much greater detail in the Proposed Findings.

41/ It should be pointed out that the discussion of "irreversible and irretrievable commitments of resources" (127-128) has many of these same problems. For example, while the expenditure of resources by the federal government during

[footnote continued on page 33]

ERDA's analysis of legal options is essentially circular. The key issue with regard to foreclosure of legal options is whether taking such action results in the loss of control over exported nuclear equipment, technology and fuels. And the key step with regard to this loss of control, as ERDA views it, is the issuance of an export license. As the Proposed Findings state, "[O]nce the facility or enriched uranium is exported, the U.S. is foreclosed from modifying the conditions in the license under which the particular export occurred" (117). Given this analysis, not surprisingly, in discussing Agreements for Cooperation and enrichment service contracts, great emphasis is placed upon the fact that, subsequent to the entry into such Agreements or contracts, licenses may be denied or conditions imposed on licenses granted (110-112). Yet when it comes to discussing the licensing power -- "one of the most important means for implementing policy changes" (116) -- the analysis comes full circle by arguing that, once a license

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41/ continued from previous page

the interim period might be of such magnitude as to constitute "an irrevocable commitment to the continuation of the international nuclear power export program," the question nonetheless remains whether the commitment of resources to any particular project or transaction might constitute an irrevocable commitment of resources or affect the eventual outcome of the NEPA review as to that particular project. Moreover, might not there be an irrevocable and irretrievable commitment of resources by another party, such as a foreign utility, involved in a transaction with a U.S. agency which would have a heavy bearing on the eventual outcome of the NEPA process?

is issued, enriched uranium and/or reactors "remain subject to the terms and conditions of the enrichment contract or the terms and conditions of the relevant Agreement for Cooperation" (117), which theoretically can be modified or terminated (but which even ERDA has earlier stated are subject to the U.S. obligation to act in "good faith"). Such reasoning simply cannot be used to bolster the argument that issuance of an export license would not foreclose options. 42/

Even assuming that future options remain legally available it must be questioned how likely it is that corrective action will be taken. For example, although the Agreement for Cooperation with Austria contains provisions relating to U.S. review of the reactor design (24), U.S. acceptance of facilities selected for reprocessing (22) and U.S. veto over storage facilities for special nuclear material (25), has such authority ever actually been exercised by the United States under similar Agreements in the past? Likewise, has

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42/ It is equally clear that ERDA's other legal grounds for concluding that issuance of an export license would not foreclose options are wholly speculative and do not support the conclusion that options are not indeed "significantly" foreclosed by such action. The impact of conditioning "future" licenses so as to modify the terms and conditions under which a foreign country holds special nuclear material or reactors previously exported from this country (118) is far from clear, while it is obvious that the United States cannot rely on the IAEA to ensure modifications in existing uses (118). As the Proposed Findings earlier admit, the United States simply does not have the legal (or practical) ability to require the IAEA to adopt alternative safeguards or safety measures (113).

NRC (or the AEC before 1975) ever imposed significant substantive conditions on a license for export of nuclear equipment or fuels? And, has there ever been a case in which an export license has been denied, once an enrichment service contract has been entered into? If the answers to these questions are in the negative, there is little reason to expect a change in the future. In point of fact, the reasonable expectation is that once an enrichment service contract has been entered into, there is very little likelihood of the conditions applicable thereto being modified in a subsequent license proceeding. And it is equally unlikely that once a license is issued, future actions will be taken through the domestic regulatory process to modify it. Indeed, ERDA essentially admits that this is the case by noting numerous caveats (110-112) to its"legal ability to adopt alternatives".

Finally, a discussion of foreclosure of options is incomplete without an evaluation of the reliance which our foreign trading partners may put on our commitments and their expectations with regard to future U.S. actions in the area of nuclear exports. Even with a specific proviso in Agreements for Cooperation, enrichment service contracts, or licenses, it seems plain that new U.S. commitments for particular projects will raise expectations abroad that such commitments will be fulfilled. Even in monetary terms, it seems likely that the $3.3 million advance payment required for a 1,000-megawatt light water reactor power plant supply contract (31) might legitimately raise the expectations in recipient countries that they are going to receive such fuel. And, in relying on such enrichment contracts, recipient countries will surely take other steps to assure that nuclear power generating systems are in place at the date when the fuel is scheduled to arrive -- actions involving the investment of literally hundreds of millions of dollars. Eight years down the road from such contracts, it may simply not be politically feasible for NRC to deny an export license. 43/ In such circumstances, it may plainly be better to stop making new commitments now in order to avoid later "misunderstandings" and the realistic foreclosure of future options.

43/ Recent events would seem to bear out this analysis. The rumor which spread through Europe in April that the United States might delay its exports of enriched uranium to the Western European countries which already depend upon such uranium for their fuel supply raised a storm of protest and required the NRC to make extensive efforts to clear up any "misunderstandings". See the *New York Times*, April 15, 1975, at 7, col. 1; the *New York Times*, April 23, 1975, at 5, col. 1.

V. The Proposed Findings Do Not Properly Analyze the Effect on the Public Interest of Deferring on Modifying Program Activities in the Interim Period

The discussion in the Proposed Findings of the "effect on the public interest of a moratorium on nuclear power export activities" (119-126), quite apart from the fact that it skews the entire analysis by not considering program alternatives short of total termination 44/, is inadequate insofar as it contains no discussion of the rationale for proceeding with certain interim program activities, no balanced appraisal of adverse effects on the public interest of deferral of program activities, and no consideration whatsoever of any public benefit which might be associated with the deferral or modification of such activities. It is not surprising, given these inadequacies, that the balance weighs heavily in favor of continuing all program activities without alteration in the interim period.

One of the most troubling aspects of ERDA's analysis of the public interest is its failure to identify any rationale for proceeding in many instances. As is made clear at various points in the Proposed Findings, the overall process leading to the export of nuclear equipment, technology and fuels is a lengthy one, with, for example, negotiations

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44/ See Point III, *supra*.

involving an Agreement for Cooperation often extending over a period of many months 45/, and nuclear fuel enrichment service contracts ordinarily being executed "eight years in advance of the first delivery of enriched uranium" (31). In such circumstances, it is difficult to understand what the incentive is, for example, to initiate negotiations with Brazil and Greece prior to August 31, 1975 (12). Given the long lead time needed for the development of a civilian nuclear power program, the question necessarily arises why a delay of several months in commencing negotiations of new agreements with countries not now dependent upon the United States for nuclear power poses any public disadvantage whatsoever.

The problem of proceeding to make commitments, when there is no clear incentive to do so, is most apparent if one examines the proposed transactions with Yugoslavia and Mexico (12-13). Nuclear fuel enrichment service contracts were entered into with such countries on August 17, 1974. 46/ Such contracts were specifically contingent upon Congressional approval of an increase in the ceiling of shipments through the IAEA. That contingency could have been removed at any time prior to September, 1975. Yet, on January 8, 1975, the AEC submitted proposals to Congress, automatically effective sixty days

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45/ See Table 2 of Exhibit C to the Affidavit of Eldon V.C. Greenberg, sworn to March 21, 1975, in Sierra Club, et al. v. United States Atomic Energy Commission, et al.

46/ Table 1 to Exhibit C of the Affidavit of Eldon V. C. Greenberg, sworn to March 21, 1975, in Sierra Club, et al. v. United States Atomic Energy Commission, et al.

later, to remove the contingency and thus commit the United States to supply enriched nuclear fuel to Mexico and Yugoslavia under an exclusive IAEA system. 47/ Given the one year available under these contracts to remove the contingency, there appears, at least as far as the public record is concerned, no need whatsoever to move as the AEC did, and certainly no need to move before the Proposed Findings were even issued.

Not only is there an insufficient analysis in the Proposed Findings of why program activities should be undertaken, but the appraisal of the adverse impact of deferring such actions is completely unbalanced, in particular because it is cast in terms of countries which have existing fuel requirements to be met, as opposed to countries which have not yet embarked upon a nuclear power program. For example, in discussing the adverse impact of a moratorium on U.S. political interests abroad, the focus is entirely on the hardship on foreign utilities which might have to shut down or reduce the operation of central nuclear power stations (120), but it is obvious that these represent only a part of U.S. commitments to date, and many of the proposed actions, i.e., enrichment service contracts with Iran, are with countries which do not now have nuclear power generating capacity and which may not have such capacity for the next decade. Likewise, in terms of the impacts

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47/ S. Rep. No. 94-8, 94th Cong., 1st Sess. (February 13, 1975).

on an importing country's ability to produce nuclear power (120-123), the emphasis is again on start-up delays and substitution costs. But it seems highly unlikely that a deferral of only several months could cause significant start-up delays of reactors scheduled to be coming into operation sometime in the 1980's or that substitution of fossil fuels would be a problem for any but the handful of countries which are already heavily commited to nuclear power.

The other purported adverse impacts on the public interest are presented by ERDA in an equally one-sided manner. To raise the foreign policy bugaboo of Soviet interim supply of enriched nuclear fuel (121) seems designed simply as a scare tactic, since the assumptions of availability of Soviet enrichment on short notice and absence of administrative delay are assumptions which, as far as the Proposed Findings indicate, have no basis in fact. As to the impact on U.S. economic and commercial interests, even the Proposed Findings concede that a decrease in nuclear exports "would have little effect on the overall U.S. balance of payments position" (125). And, the argument that suspension of program activities would "destroy foreign confidence in the dependability of the U.S. as a supplier of vital energy material" (126) seems a rather drastic result to occur from a several month suspension of activities to carry out a policy review. 48/ One is necessarily forced to ask whether the AEC's suspension of enrichment contracting for various periods in the past (30-31) 49/ -- suspensions

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48/ It should be noted generally that broad conclusory statements of this sort, with no factual support -- and the Proposed Findings are permeated with them -- simply do not suffice to carry the weight of ERDA's argument that "business as usual" is the proper course to follow.

49/ See generally Statement of Dr. Dixy Lee Ray before the Joint Committee on Atomic Energy, Hearings on Uranium Enrichment, 93d Cong., 2d Sess. (August 6, 1974).

of several months -- had this effect, and, if they did not, one must ask why a suspension for a NEPA review would.

Finally, contrary to ERDA's gloomy assumptions, it may be that deferring or modifying program activities could have some beneficial effect on the public interest -- a possibility that is never alluded to in the Proposed Findings. ERDA's NEPA review of nuclear export activities is not the only governmental review of such activities which is currently underway. The study of national and international safeguards mandated by Section 14 of the Export Administration Act Amendments of 1974 50/ is soon to be released and may well contain important suggestions for restructuring current policies and practices. This spring, moreover, Congress has begun yet another

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50/ Section 14 of the Export Administration Act Amendments of 1974, Pub. L. No. 93-500, 88 Stat. 1552 (October 29, 1974), calls upon the President

> "to review all laws, regulations issued thereunder by the Atomic Energy Commission the Department of Commerce, and other Government agencies, governing the export and re-export of materials, supplies, articles, technical data or other information relating to the design, fabrication, development, supply, repair or replacement of any nuclear facility or any part thereof, and to report within six months to the Congress on the adequacy of such regulations to prevent the proliferation of nuclear capability for non-peaceful purposes. The President is also directed to review domestic and international nuclear safeguards and to report within six months to the Congress on the adequacy of such safeguards to prevent proliferation, diversion or theft of all such nuclear materials and on efforts of the United States and other countries to strengthen international nuclear safeguards in anticipation of the Review Conference scheduled to be held in February, 1975, pursuant to Article VIII, section 3 of the Treaty on the Non-Proliferation of Nuclear Weapons."

intensive review of our export activities, and Senators Percy, Ribicoff and Glenn have introduced a bill in the Senate, S.1439, which seeks to rationalize the current export licensing scheme so as to reduce safeguard risks. 51/ As Senator Ribicoff said in introducing such bill, "Unless something is done -- and done quickly -- to reverse this trend [of nationalism and commercialism in reactor sales], the spread of nuclear weapons and the threat of nuclear blackmail may be irreversible." 52/ And, pursuant to Article VIII(3) of the NPT, a comprehensive review conference is scheduled to be held this May in order to "review the operation of [the] Treaty with a view to assuring that the purposes of the preamble and the provisions are being realized."

In light of the current, ongoing reviews of the nuclear export problem, and in light of the substantial public concern with regard to the regulation of the international nuclear power fuel cycle, 53/ there may well be a substantial public interest in modifying or deferring program activities in the interim period. Indeed, in recognition of the need to resolve some of the problems associated with the burgeoning world nuclear economy, numerous members of Congress have urged a slowdown or modification of export activities, as in the public

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51/ See 121 Cong. Rec. S.5960-5964 (daily ed., April 15, 1975)

52/ 121 Cong. Rec. S. 5962 (daily ed., April 15, 1975).

53/ See, e.g., the New York Times, March 12, 1975, at 34, col.1. (editorial on reactor sales to Iran); The Washington Post, December 19, 1974, at A14, col. 1 (editorial on nuclear safeguards in the Middle East).

interest at this time. Thus, for example, Senator Hartke of Indiana, focusing on transportation, reprocessing and waste storage problems alone, stated during Congressional debates last summer on proposed amendments to the Atomic Energy Act of 1954:

> "There are major unresolved questions with regard to transportation hazards involved in the sale or grant of nuclear power plants to foreign countries.
>
> "Until these issues are thoroughly reviewed by the Congress, I would urge the administration to hold off on signing any international agreements for the sale or grant of nuclear power plants." 120 Cong. Rec. S. 12127 - S. 12128 (July 10, 1974).

And, in introducing a resolution (S.J. Res. 51) to defer a proposed loan by Eximbank to support the sale of a 600-MWE nuclear power generating system to South Korea, pending completion of the Presidential safeguards study under the Export Administration Act, Senator Stevenson of Illinois recently stated:

> "Deferral of final approval of this transaction until the Executive Branch and the Congress have had an opportunity to assess the adequacy of U.S. and international efforts in preventing unrestricted nuclear proliferation is essential.

> "U.S. laws and regulations are now undergoing extensive scrutiny to determine their adequacy in preventing proliferation and non-peaceful nuclear capability. The recently created Nuclear Regulatory Commission, which is intended to regulate the construction, operation, and use of nuclear reactors and materials, and the Energy Research and Development Authority, which is intended to play a role in U.S. assisted nuclear development, have yet to become fully organized and operational.
>
> "Under these circumstances, it would be folly for the United State to proceed at this point with subsidized assistance for the development of nuclear capability in South Korea...."
> 121 Cong. Rec. S.3364 (March 7, 1975).[54]

Secretary of State Kissinger stated before the United Nations General Assembly last fall:

> "Heretofore the United States and a number of other countries have widely supplied nuclear fuels and other nuclear materials in order to promote the use of nuclear energy for peaceful purposes. This policy cannot continue if it leads to the proliferation of nuclear explosives. Sales of these materials can no longer be treated by anyone as a purely commercial competitive enterprise."
> Department of State Press Release No. 373 (September 23, 1974).

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[54] This transaction was in fact withdrawn by Eximbank. See 121 Cong. Rec. S.3598 - S.3599 (March 11, 1975) (Statement of Senator Stevenson).

If these words are to be taken seriously, it cannot by any stretch of the imagination be deemed in the public interest for the United States to proceed to promote and foster nuclear power development on a worldwide scale on a "business as usual" basis during the interim period. Such an approach, as Secretary of State Kissinger emphasized, serves neither the world community's nor our own purposes.

* * * *

In conclusion, based upon the critique set forth above, we do not believe that the Proposed Findings, as currently presented, provide an adequate basis under NEPA for decision-makers to determine whether, and if so, how to proceed with nuclear export activities pending release of the final Programmatic Statement. We urge ERDA to proceed at once, in cooperation with other responsible agencies, to fully revise the Proposed Findings in form and substance in accordance with the recommendations contained herein and to recirculate them in proposed form prior to making any final determination concerning continuation of program activities. Only in this way can ERDA fulfill its commitments and meet its responsibilities under NEPA.

If you have any questions regarding the comments set forth herein, please do not hesitate to contact the undersigned.

Very truly yours,

Eldon V. C. Greenberg
Counsel for the Sierra Club,
Environmental Defense Fund,
National Parks and Conservation Association,
Natural Resources Defense Council, and
Friends of the Earth

Senator Glenn. Senator Percy has—I think you have commented somewhat on this earlier so maybe we can keep this one very, very brief. On page 10 you state:

> It is plain that the IAEA system, as presently constituted, is not sufficiently able to deal with the full range of risks associated with fission power development.

Yesterday a witness finally admitted that IAEA had no enforcible, visible security standards. What ways do you think IAEA is deficient?

We have covered that a little bit, but you may wish to make an additional comment on that.

Mr. Greenberg. I think it is clear that the IAEA is deficient insofar as it does not set mandatory physical security standards.

One of the other points that I made in my written testimony is that there is a problem inherent even with the accountancy system as it is now structured. And that is that, as civilian nuclear power programs grow in size, the IAEA accountancy safeguards system will tend to become less and less able to pick up diversions which are small in terms of percentage, but which may be strategically significant.

So, as we are talking about greater and greater growth in the nuclear industry worldwide, we are talking in a sense about a less efficient system to detect diversions.

Senator Glenn. Let me just ask you one other question, then we will end this. We have gone longer than I had anticipated, but it has been very interesting. Let me ask you one more question.

Why is it that you think that ERDA rather than NRC is preparing an environmental statement on the U.S. nuclear power export program? Should NRC have this responsibility? Are you satisfied with this? Would you comment on that whole procedure as to what you think of it?

Mr. Greenberg. The division of responsibility between ERDA and NRC came about—with regard to the impact statement—as a result of the division of responsibility in the Energy Reorganization Act of 1974, which left the authority for agreements for cooperation, for safeguards and so forth within ERDA.

I think if legislation such as S. 1429 had been passed, vesting much more authority in NRC as far as the nuclear export process were concerned, then NRC would have been the more appropriate agency to carry out this analysis. From an overall regulatory standpoint I think it would be desirable to have an agency such as NRC rather than ERDA carry out an environmental review of this nature. The problem has been that agreements for cooperation, safeguards and so forth are the responsibility of ERDA under present law.

Senator Glenn. Are you satisfied with the way those impact statements have been going now?

Mr. Greenberg. The draft impact statement, which is required by order of the Federal District Court here in Washington to be issued sometime early this summer, has not yet been released, and thus we are not really able to evaluate yet the adequacy of ERDA's effort in this area.

Senator GLENN. Thank you very much.

Mr. KNIGHT. Senator?

Senator GLENN. Yes.

Mr. KNIGHT. Perhaps I should have said this before Senator Percy left, but I would just like to state, briefly, on behalf of Friends of the Earth, our position on nuclear power. I think it was mischaracterized. We do oppose nuclear power. We have taken this position based on an analysis of the risks and the benefits that we see inherent in the technology and the position of the technology in the whole energy situation of——

Senator GLENN. To clarify this you oppose nuclear power in any form either domestically or abroad. Is that correct?

Mr. KNIGHT. The position of "Friends of the Earth" is to oppose continued growth of the nuclear power industry, and specifically light-water reactor technology in the United States.

Senator GLENN. Do you propose shutting nuclear plants?

Mr. KNIGHT. No; we are supporting a position to postpone the construction and licensing of any new ones, except those that are nearing completion, and to hold the line where we are until certain questions that we feel are critical have been satisfactorily answered.

Senator GLENN. What questions are those?

Mr. KNIGHT. The questions of how we are going to manage the wastes, whether we can adequately safeguard nuclear materials, whether the safety systems installed on nuclear reactors today are, in fact, proven and effective.

I remember you were at the joint hearing with the Joint Committee on Atomic Energy and you got into this with Dan Ford a bit. I think these are some of the issues that we feel are necessary to be decided before further use of this technology goes on. I think that the dangers involved with the terrible and long-range toxicity of radioactive materials mandate that these questions be answered, and also that other alternatives be examined, before we embrace this technology as the vanguard of our energy supply.

Senator GLENN. OK.

We appreciate both of you being here very much. You had excellent testimony. If you have any other statements feel free to submit them to us.

Mr. GREENBERG. We would be most happy to. Thank you, Mr. Chairman.

Mr. KNIGHT. Thank you.

[The prepared statement of Mr. Greenberg, with an appendix follows:]

TESTIMONY OF

ELDON V. C. GREENBERG*

ON BEHALF OF THE

SIERRA CLUB, NATURAL RESOURCES DEFENSE COUNCIL,

ENVIRONMENTAL DEFENSE FUND, FRIENDS OF THE EARTH,

AND NATIONAL PARKS AND CONSERVATION ASSOCIATION, ON

S. 1439, THE EXPORT REORGANIZATION ACT

OF 1975,

PRESENTED ON MAY 1, 1975

BEFORE THE

SENATE COMMITTEE ON GOVERNMENT OPERATIONS

*Center for Law and Social Policy
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SUMMARY OF POSITIONS

In the following testimony, the Sierra Club, the Natural Resources Defense Council, the Environmental Defense Fund, Friends of the Earth, and National Parks and Conservation Association set forth their position that there is a need for legislation such as S.1439 for at least five reasons:

(1) No independent non-promotional agency has had an effective check over safeguards procedures to which the United States commits itself;

(2) There has been complete reliance on the IAEA system of international safeguards which, as presently constituted, is not sufficiently able to deal with the full range of risks associated with fission power development;

(3) The authority for issuance of export licenses has been split over several agencies;

(4) There has been a lack of substantive review in the export licensing process; and

(5) There has been a lack of procedural safeguards in the export licensing process.

In light of such circumstances, the environmental groups urge a rationalization and strengthening of the United States' nuclear export licensing process, in particular, by the transfer of safeguards authority out of a promotional agency such as ERDA and into an independent, regulatory body. With regard to S.1439, they further express the following views:

(1) Licensing authority should be centralized in the Nuclear Regulatory Commission and not the Department of Commerce;

(2) Controls over the negotiation of bilateral Agreements for Cooperation should be strengthened;

(3) The safeguards criteria should be expanded to include the concept of "adequacy", and other review criteria should be specifically set forth;

(4) Consideration should be given to relating United States' safeguards requirements to international safeguards requirements;

(5) Provision should be made for appropriate public participation in the export licensing process;

(6) The role of the Arms Control and Disarmament Agency in the export process should be expanded;

(7) Any training program established by the Nuclear Regulatory Commission should include health, safety, and environmental controls; and

(8) Safeguards studies under S.1439 should be coordinated with other federal studies.

TESTIMONY OF ELDON V.C. GREENBERG ON BEHALF OF THE SIERRA CLUB, NATURAL RESOURCES DEFENSE COUNCIL, ENVIRONMENTAL DEFENSE FUND, FRIENDS OF THE EARTH, AND NATIONAL PARKS AND CONSERVATION ASSOCIATION, ON S. 1439, THE EXPORT REORGANIZATION ACT OF 1975, PRESENTED ON MAY 1, 1975 BEFORE THE SENATE COMMITTEE ON GOVERNMENT OPERATIONS

I am Eldon Greenberg of the Center for Law and Social Policy, a public interest law firm. I appreciate the invitation to appear before the Committee today to provide the advice of the Sierra Club, the Natural Resources Defense Council ("NRDC"), the Environmental Defense Fund ("EDF"), Friends of the Earth ("FOE"), and the National Parks and Conservation Association ("NPCA") with respect to the Energy Reorganization Act of 1975, S.1439 (the "Bill"). I have acted as counsel to these groups (except FOE) in a lawsuit which has led to the preparation by the Energy Research and Development Administration ("ERDA") of an environmental impact statement on the United States nuclear power export program (Sierra Club, et al. v. Energy Research and Development Administration, et al., D.D.C., Civil Action No. 1867-73), and I have been asked by them to coordinate the presentation to this Committee today of their views on the important issues of national policy raised by the Bill. I will focus this morning on the provisions of the Bill relating to the export of nuclear equipment, technology and fuels becuase I understand that the risks inherent in such exports are of particular concern to the Committee and the major object of the proposed legislation.

The environmental groups are all non-profit membership organizations deeply concerned and knowledgeable about the consequences of fission power. Their combined membership exceeds 275,000 persons throughout the United States and abroad. 1/ They have taken an active role in the public debate surrounding the growth of commercial fission generating capacity by means of litigation, testimony, comments to regulatory bodies, and informational and educational programs designed to provide the public with data relevant to issues posed by fission power development and to stimulate informed public discussion with respect to such issues. And, in particular, they have been concerned with the international implications of the spread of fission power as an energy source.

1/ The Sierra Club, whose principal place of business is at 220 Bush Street, San Francisco, Calif. 94104, has a membership of approximately 150,000 persons, including persons residing in 67 foreign countries. NRDC, whose principal office is at 15 West 44th Street, New York, N.Y. 10035, and which has additional offices in Washington, D.C. and Palo Alto, Calif., has a membership of approximately 20,000 persons, including members residing in eight foreign countries. EDF, whose principal place of business is 162 Old Town Road, East Setauket, N.Y. 11733, has a membership of approximately 57,000 persons and a 700 member Scientists' Advisory Committee, including members residing in 18 foreign countries. FOE, whose principal place of business is 529 Commercial Street, San Francisco, Calif. 94111, has a membership of 20,000 persons and is affiliated with "sister organizations" in twelve foreign countries. NPCA, whose principal office is 1701 18th Street, N.W., Washington, D.C. 20009, has a membership of approximately 45,000 persons, including members residing in 65 foreign countries.

The importance of rationalizing our regulatory framework and asserting greater control over nuclear export activities cannot be overemphasized. The wisdom of a commitment to fission power as an energy source is being called increasingly into question 2/, and recent events, most notably the test of a nuclear explosive device carried out by India in May, 1974, and the promises made in June 1974, by ex-President Nixon to supply nuclear power generating systems and enriched fuels to Egypt and Israel, have provided dramatic illustrations of the problems associated with the spread of fission power. Given the current lack of scientific knowledge, regulatory competence and political stability worldwide, the environmental groups have serious misgivings about proceeding to promote fission power development at this time.

2/ At the Twenty-Third Pugwash Conference on Science and World Affairs, held in Aulanko, Finland, from August 30 through September 4, 1973 -- a conference attended by 108 distinguished scientists from twenty-nine countries and six international organizations -- a working group assigned to deal with the problem of "Radioactive Pollution of the Environment in the Context of the Energy Problem", issued a Report evaluating the problems of and alternatives to fission energy. This Report reached the following basic conclusion:

> "Owing to the potentially grave and as yet unresolved problems relating to waste management, diversion of fissionable material, and major radioactivity releases arising from accidents, natural disasters, sabotage or acts of war, the wisdom of a commitment to nuclear fission as a principal energy source for mankind must be seriously questioned at the present time."

The Continuing Committee of Pugwash adopted the same basic conclusion, further emphasizing that:

> "Every effort should be made to develop alternatives [to fission power] by greatly accelerating research on potentially cleaner energy sources, and by reexamining the relation between genuine, sustainable needs for energy on the one hand, and projected demands on the other. In the meantime, every effort should be made to minimize by technical and regulatory means the hazards of fission...."

Upon the assumption that nuclear exports may continue, however, I intend today to set out why the environmental groups believe there is a need for legislation such as S.1439, why they believe such legislation can be effective, and how they believe such legislation should be structured so as to begin to eliminate or reduce the risks now associated with our nuclear export scheme.

I. The Need for the Legislation

The export from the United States of nuclear power generating equipment and nuclear fuels has been steadily escalating over the past several years. In a recently released study, ERDA has estimated that, during the period July 1, 1974 through August 31, 1975, the United States would receive approximately $200 million for enrichment services and $1.2 billion from sales of nuclear production facilities and related equipment to foreign customers. 3/

3/ ERDA, Proposed Findings Supporting Determination Related to International Nuclear Power Export Activities Pending Preparation of a Section 102 (2)(C) NEPA Environmental Statement 124 (April 7, 1975) (hereinafter cited as the "ERDA Interim Analysis").

The United States now has Agreements for Cooperation Concerning Civil Uses of Atomic Energy which authorize the export from the United States of nuclear power generating systems and nuclear fuels ("Agreements for Cooperation"), with 21 countries, as well as international organizations such as the European Atomic Energy Community ("Euratom ") and the International Atomic Energy Agency (the "IAEA"). 4/ The negotiation of new or superseding Agreements for Cooperation has been undertaken in the past year or will be shortly undertaken with Egypt, Israel, Iran, Greece and Brazil. 5/ Earlier this year, moreover, a proposal was submitted to Congress, and has since become effective, increasing the amount of special nuclear material which is authorized to be shipped to the IAEA, and thus permitting Yugoslavia and Mexico, which do not have bilateral Agreements for Cooperation with the United States, to receive nuclear fuel from this country through the conduit of the IAEA. See S. Rep. 94-8, 94th Cong., 1st Sess. (February 13, 1975).

4/ See 121 Cong. Rec. S. 5990 (daily ed., April 17, 1975).

5/ ERDA Interim Analysis 11-12.

Through June 30, 1974, the Atomic Energy Commission had entered into 95 toll enrichment contracts with foreign customers covering partial fuel requirements of about 68,000 megawatts of generating capacity and since June 30, 1974, 54 additional contracts covering fuel requirements for approximately 51,000 megawatts have been executed. 6/ And, as of October 25, 1974, there were 51 foreign nuclear power plants of U.S. origin operating, under construction, or on order. 7/

The spectacular size of the United States nuclear power export program has been achieved in the past 20 years since President Eisenhower's famous "Atoms for Peace" speech with little analysis having been made of the risks which the spread of fission power poses. The combination of both promotional and regulatory functions in one agency inevitably has led to the promotion of nuclear power as a purely commercial enterprise at the expense of careful regulation.

Within the past two or three years, there has been an increasing effort to bring our nuclear export program under control. The effort in Congress last summer to amend the Atomic Energy Act

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6/ ERDA Interim Analysis 6-7.

7/ Exhibit C, Table 8, to the Affidavit of Eldon V. C. Greenberg, sworn to March 21, 1975, in *Sierra Club, et al.* v. *Energy Research and Development Administration, et al.*

of 1954 to provide for increased Congressional scrutiny over Agreements for Cooperation is one example of this effort. 8/ Another example is the enactment last fall of Section 14 of the Export Administration Act Amendments of 1974. 9/ which calls upon the President to review and to report to Congress with regard to the adequacy of national and international safeguards to prevent proliferation, diversion and theft of nuclear materials. Yet a third example is the lawsuit brought by four of the environmental groups which I represent in October, 1973, to compel the Atomic Energy Commission (and other responsible agencies) to prepare an environmental impact statement on their actions to authorize, assist, contract for and license the export of nuclear power generating systems and fuels. 10/

8/ See debates on S.3698 and H.R. 15582, 120 Cong. Rec. S.11416-S.11519 (June 25, 1974); 120 Cong. Rec. S. 12112 - S. 12128 (July 10, 1974); 120 Cong.Rec. H.R.7432- H.R.7450 (July 31, 1974). The bill was ultimately enacted into law on October 26, 1974. See Pub. L. No. 93-485, 88 Stat. 1460; see generally S. Rep. No. 93-964, 93d Cong., 2d Sess., Conf. Rep. No. 93-1299, 93d Cong., 2d Sess., 1974 U.S. Code, Cong. & Adm. News 5934-5938.

9/ Pub. L. No. 93-500, 88 Stat. 1552 (October 29, 1974).

10/ This lawsuit, it should be stressed, focused not just on traditional "pollution" and safety issues, but on the entire safeguards problem as well. As a result of the lawsuit, the Atomic Energy Commission agreed to prepare an environmental impact statement (see 39 Fed. Reg. 20835 [June 14, 1974]) and, it has been ordered by the United States District Court for the District of Columbia to release such statement by August, 1975. The opinion of the Court is reported at 6 E.R.C. 1980. The environmental groups' suggestions with regard to the scope and contents of such statement are contained in a letter, dated August 15, 1974 to Dr. James Liverman, Assistant General Manager for Biomedical and Environmental Research and Safety Programs of the Atomic Energy Commission. With the permission of the Committee, I would like to submit such comments as an Appendix to this testimony.

There is obviously still a long way to go in bringing the international nuclear power fuel cycle under appropriate regulation. The ERDA Interim Analysis, released on April 7, for example, reveals that there are numerous gaps in the regulatory system, that ERDA, at least, retains an unabashedly promotional bias, and that there is still an unwillingness in certain agencies of the Government to give full recognition to the risks posed by the world-wide growth of fission power generating capacity. 11/

Specifically, as regards the adequacy of the current regulatory scheme in the United States, there are at least five critical problems, well identified by the sponsors of the Bill in their remarks of April 15, 1975 12/, which should be emphasized:

(1) The key stage in the overall nuclear export process has been the negotiation and conclusion of Agreements for Cooperation which have established the safeguards requirements applicable to transfers of nuclear equipment, technology and fuels. Such Agreements have, in the past, been primarily the responsibility of the Atomic Energy Commission, and now they are primarily the responsibility of ERDA. ERDA, though it is an agency which has the task of promoting nuclear

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11/ The ERDA Interim Analysis is, moreover, an example of the kind of superficial assessment made by federal agencies of U.S. export programs. We are now in the process of preparing extensive comments (to be filed next week) on such Analysis, and, with the permission of the Committee, I would like to submit them for record as an Appendix to this testimony.

12/ 121 Cong. Rec. S.5960 - 5964 (daily ed., April 15, 1975).

energy, also has the responsibility for the safeguards aspects of Agreements for Cooperation. 13/ No independent, non-promotional agency has an effective check, at this stage of the process, over safeguards procedures to which the United States commits itself.

(2) In establishing safeguards under Agreements for Cooperation, there has been a complete reliance on the international IAEA accountancy system. This system is designed only to detect diversion. It cannot prevent such diversion, and it does not provide for physical security or other protective measures aimed at preventing theft or sabotage by sub-national groups. Moreover, as civilian nuclear programs grow in size, the IAEA accountancy system will tend to become less and less able to pick up diversions which are small in terms of percentage but nonetheless strategically significant. Finally, the IAEA is currently both under-staffed and under-budgeted. For example, it is our understanding that its fiscal year 1975 budget for safeguards was approximately only $59 million and it has only 59 full-time inspectors in the field. 14/ While current efforts are being made to improve the IAEA system and at least to develop recommendations for adequate physical

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13/ This responsibility is lodged in its Division of International Security Affairs.

14/ NBC News, "The Nuclear Threat to You" (February 2, 1975).

security standards throughout the world 15/, it is plain that the IAEA system, as presently constituted, is not sufficiently able to deal with the full range of risks associated with fission power development.

(3) The authority for issuance of export licenses within the United States has been split among several agencies, and, with regard to some transfers, it has been virtually nonexistent. For example, while the Atomic Energy Commission, and now the Nuclear Regulatory Commission ("NRC"), have had the responsibility for the issuance of export licenses under the Atomic Energy Act for reactors and major components thereof, the Department of Commerce has had the responsibility for granting export clearances for equipment and facilities not constituting a reactor or major component. 16/ This split of authority unnecessarily increases the risk of lack of effective coordination among licensing agencies. Moreover, some transfers, such as transfers of technology by U.S. corporations (i.e., licensing of patents, know-how, etc.) have been essentially unregulated, thus permitting development of large scale nuclear power industries to take place abroad, such as in France. 17/

(4) There has been a total lack of substantive review in actual licensing proceedings. The consideration of export licenses in the past by the Atomic Energy Commission has been essentially

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15/ ERDA Interim Analysis 106.

16/ ERDA Interim Analysis 34.

17/ See "Exports of Nuclear Materials and Technology", Hearings before the Subcommittee for International Finance of the Senate Committee on Banking, Housing and Urban Affairs, 93d Cong., 2d Sess., 10-11, 28-29 (1974).

ministerial, and export license applications have not even been reviewed by the Commissioners but have merely been processed by the Staff. 18/ All that NRC now passes on in considering export license applications are the questions (1) whether the issuance of the license would be within the scope of and consistent with an Agreement for Cooperation and (2) whether the issuance of the license would be inimical to the common defense or security. 19/ However, the determinations on these questions are based upon the advice of ERDA Division of International Security Affairs 20/, and NRC does not make any independent review of them. In addition, it should be pointed out, that, under current procedures, the NRC does not examine any health, safety or environmental impacts which might be associated with the grant of a particular license. Thus, for example,

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18/ As a result of the recent public furor over the importation of plutonium into the United States, see the New York Times, March 29, 1975, at 22, col. 1, the NRC has changed this policy and announced that, pending a rulemaking proceeding covering transportation of special nuclear material, including plutonium, by air, the Commissioners themselves will review new applications for licenses for the import or export of significant quantities of plutonium and other special nuclear materials. See letter, dated April 3, 1975, from Lee Gossick, Executive Director for Operations of NRC, to Mr. George Murphy, Executive Director of the Joint Committee on Atomic Energy.

19/ ERDA Interim Analysis 35.

20/ ERDA Interim Analysis 34.

an export license could be issued for a nuclear power generating system which did not have an emergency core cooling system without any review of the risks posed by such transaction.

(5) There has been a lack of procedural safeguards within the export licensing process. In part because the licensing process has not involved consideration of substantive issues, there has been no opportunity for interested members of the public, other than the applicant, to participate in licensing proceedings. For example, with regard to the licensing proceedings on applications for the export of special nuclear materials, there has not been public notice in the Federal Register of the filing of license applications or the commencement of licensing proceedings. 21/ Thus, interested persons have had no way of knowing that export licenses were even under consideration, let alone of having the opportunity to participate in the proceedings considering such applications.

21/ ERDA Interim Analysis 38.

II. The United States' Ability to Exercise Effective Control Over the International Nuclear Fuel Cycle.

Before going on to discuss the specific regulatory proposals embodied in S.1439, a few words should be said about the argument which is sometimes made -- and which I am sure will be made against the Bill -- that the United States cannot act unilaterally to impose safeguards (or environmental controls) on the international fuel cycle without ruling ourselves out of further international trade. In response to persons calling for a moratorium on nuclear exports, it is often argued that, if the United States ceased supplying nuclear equipment, technology and fuels, other nations with fully developed nuclear industries -- nations less "responsible" than the United States -- would step into the breach, and the risks inherent in the growth of fission power worldwide would be increased rather than decreased. 22/

22/ See, e.g., Statement of Senator Pastore, 121 Cong. Rec. S. 5989-5990 (daily ed., April 17, 1975).

When the issue is then raised as to whether the United States, assuming the continuation of its export of nuclear equipment, technology and fuels, should move to impose stringent standards on recipient countries, it is further argued that imposition of more stringent standards would "competitively disadvantage" the United States, once again driving foreign countries, anxious to obtain nuclear power, to our "irresponsible" competitors. The result of this argument, if accepted, is that the United States must require recipient countries to meet standards no different than those of any other supplier or potential supplier. In other words, the "lowest common denominator" prevails, and, in the end, the United States has become just as "irresponsible" as its irresponsible foreign competitors.

The argument that unilateral standards are ineffective and counterproductive in the long term simply fails to recognize the still powerful position of the United States. Though the United States' monopoly over nuclear technology is being eroded, this country still holds a commanding position in the world market. Projections prepared by the Atomic Energy Commission in early 1974 show that the United States, which was the sole exporter of enriching services for fuel for power reactors (outside the Communist bloc) during the period 1970-73, will continue to supply more than 85% of foreign separative work requirements through 1980 and more than 71% of such requirements through 1983. 23/ The same projections

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23/ Atomic Energy Commission Responses to Plaintiffs' Additional Interrogatories, dated February 14, 1974, in Sierra Club, et al. v. Energy Research and Development Administration, et al.

estimate that "the United States will eventually supply between 40% and 60% of new foreign requirements for separative work during the 1980s and 1990s." 24/ And, such projections indicate that U.S. private sales of nuclear plants and equipment abroad will be in the range of $1 billion to $3 billion per year through 1983. 25/ With this commanding position in the market, it is far from clear that imposition of additional standards by this country would undercut the competitiveness of our industry or send prospective foreign purchasers running off to the French. Indeed, it might be equally possible that suppliers of technology outside the United States would follow the United States' lead, for they, too, as nuclear powers, have an interest in restraining the spread of nuclear weapons and protecting the world community against terrorist activity or environmental disaster. Finally, the United States can encourage foreign countries to accept our standards by offering economic and other incentives to purchase nuclear equipment and fuels from us. The point, as Senator Ribicoff stated eloquently in his remarks on April 15, 26/ is that time is running out, and several years from now, as nuclear technology has spread to more and more countries, the United States may no longer be in such a position to exercise world leadership. It is thus necessary to act now, while the opportunity still exists, in order to reduce the risks associated with the worldwide growth of fission power generating capacity.

24/ *Id.*

25/ *Id.*

26/ 121 *Cong. Rec.* S.5962 (daily ed., April 15, 1975).

III. Analysis of S.1439

In light of the circumstances outlined above, the environmental groups firmly favor the concept behind S.1439 and the recognition that there is a need to rationalize and strengthen the United States nuclear export licensing process. It is essential, in their view, to transfer, as the Bill does in Section 6(a), safeguards authority out of a promotional agency such as ERDA and into an independent, regulatory body. I have a number of specific comments, however, with regard to the structure of the export licensing process as suggested by S.1439, which I hope will assist the Committee in its effort to develop a new and effective regulatory framework for nuclear exports.

(a) Licensing Authority Should be Centralized in the NRC and Not in the Department of Commerce -- While the environmental groups strongly concur with the view of the sponsors of the Bill that it is necessary to centralize licensing functions, they do not believe that such functions should be centralized within the Department of Commerce [Section 4]. There are at least three reasons for our objections to this approach:

(1) To place licensing functions within the Department of Commerce is to raise, yet again, the same problems of an agency combining both promotional and regulatory functions which the Energy Reorganization Act of 1974 27/ was designed to end.

(2) The Department of Commerce does not have the expertise to make any substantive decisions associated with the consideration of nuclear export licenses. The way S.1439 is structured, all the

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27/ Pub. L. No. 93-438, 88 Stat. 1233 (October 11, 1974).

functions of NRC under Sections 53(a), 62, 82(c), 103 and 104 of the Atomic Energy Act as they relate to the issuance of export licenses [Section 4(c)(1)] are transferred to the Secretary of Commerce. This means that, to the extent that any health, safety or environmental reviews are to be carried out with regard to nuclear export licenses, they must be carried out by the Department of Commerce. In our view, under current law, NRC is required, under the National Environmental Policy Act, to consider the environmental implications of and alternatives to its export licensing activities and review such issues as adequacy of emergency core cooling systems, waste management plans, etc. Obviously the Department of Commerce is not equipped to carry out such reviews. Rather, NRC is the appropriate agency to do so.

(3) Speed in handling export license applications is not a justification for a transfer of functions to the Department of Commerce. Senator Ribicoff, in introducing the Bill, noted that the Department of Commerce Office of Export Administration acts on 95% of all applications within two weeks. 28/ It is not at all clear that this kind of rapid clearance is what is needed in the sensitive area of nuclear exports. Indeed, the problem with the licensing process, as it currently exists, is that it has been too superficial: license applications have been processed by the Atomic Energy Commission in an extremely short time, and the entire docket has often consisted of little more than the license application, a notice of no objection to it, and the order issuing the license itself. What is needed is a less perfunctory licensing process, with more detailed scrutiny given to the particulars of individual license applications.

28/ 121 Cong. Rec. S.5961 (daily ed., April 15, 1975).

In sum, if the goal is to centralize licensing functions, the most rational approach is to transfer to NRC those licensing functions which are now vested in either ERDA or the Department of Commerce. 29/ Of course, in order to ensure that the appropriate kinds of substantive reviews are carried out by NRC, any legislation should require a finding of safeguards comparability and adequacy, as well as other appropriate findings, i.e., consistency with the health and safety of the public, and environmental quality, as a precondition to the issuance of a license. See paragraph (c) below.

(b) Controls Over the Negotiation of Bilateral Agreements For Cooperation Should be Strengthened -- While the environmental groups support the transfer in Section 5 of the Bill to the Secretary of State of the responsibility for negotiating and concluding bilateral Agreements for Cooperation, they do not believe that the Bill, as presently drafted, focuses enough attention on this key step in the export process. As noted above, conclusion

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29/ In this regard, we would note that it is especially important to make transfers of technology, the authority over which is now lodged in ERDA, subject to a full assessment on an individual basis, as the Bill has attempted to recognize in Sections 4(d)(1) and 7(a). One problem, however, is that under current practice, see 10 C.F.R. Part 110 (Supp. 1974), there is no formal individual proceeding for such transfers, and thus the Bill should remedy this situation.

of bilateral Agreements for Cooperation is, most commonly, the first step in the overall nuclear export process. It establishes the framework under which specific contracts are entered into and licenses issued, and lays down the basic parameters of the safeguards applicable to exported nuclear facilities and fuel. In the past, safeguards issues have only been considered at the time an Agreement for Cooperation has been negotiated, and, thereafter, agency action imposed no additional, substantive conditions on the construction and operation of exported nuclear power generating systems or the use, transportation and management of exported nuclear fuels and associated radioactive wastes. Even if a safeguard certification authority is vested in NRC as part of the licensing process [Section 7(a)], the safeguards embodied in an Agreement for Cooperation will be a dominant factor in consideration of an export license. This is especially so because, once an Agreement for Cooperation is entered into, expectations are built up in an agreeing country that such country will ultimately receive nuclear technology and fuels subject to the procedures and safeguards to which it has agreed. It will not be easy eight to ten years down the line, after a prospective foreign purchaser has invested millions of dollars in nuclear power generating systems, to deny a license application on the grounds that the safeguards requirements embodied in an Agreement for Cooperation are inadequate. 30/ The environmental groups would thus make the

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30/ An example of the kinds of expectations that can be built up, and the pressure which such expectations of foreign countries will exert on U.S. decision makers, can be found in the recent storm of protest in Western Europe over what was thought to be a decision by NRC to delay imports and exports of enriched uranium pending review of U.S. policies in this area. See the *New York Times*, April 15, 1975, at 7, col. 1; the *New York Times*, April 23, 1975, at 5, col. 1.

following two suggestions as far as Agreements for Cooperation are concerned:

(1) At a minimum, criteria established by NRC for use in the development of Agreements for Cooperation [Section 7(b)] must actually be met before such Agreements can be concluded. To merely provide for the "use" of such criteria is not enough; they must be controlling. 31/

(2) A nuclear proliferation assessment statement [Section 8(a)] should be prepared in connection with the negotiation and conclusion of an Agreement for Cooperation. Since, in most instances, this is the first step in a country's effort to develop a nuclear economy, it seems essential that before the United States commits itself to assist in such a step, it assures itself as to the proliferation risks involved.

(c) Review Criteria Should be Expanded -- There is no question that any safeguards review by NRC should include both materials accountability and physical security [Section 3(6)]. However, diversion of materials by a foreign national government in order to fabricate a nuclear weapon is a problem peculiar to non-weapons states, and in a sense, it is a problem not precisely addressed by the U.S. safeguards system. Thus, it is not quite clear from the context of the Bill what "safeguards substantially at least comparable to safeguards required by the Commission in the United States" [Section 7(a)] means. In order to make a meaningful judgment

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31/ An alternative might be to write no safeguards provisions at all into an Agreement for Cooperation but to have a specific provision in such Agreement making the issuance of licenses thereunder subject to safeguards requirements established by NRC.

as to the appropriateness of specific safeguards measures in specific countries, the regulatory and political climate of such countries must be analyzed in detail. Safeguards which are "comparable" to U.S. safeguards in one country may be sufficient to prevent diversion, but in another country they may not. Consequently, we would suggest that, in addition to a requirement that safeguards be at least equivalent or comparable, there be a second criterion: that the safeguards be "adequate to protect against the risk of diversion, sabotage or theft in the recipient country." 32/ Further, it should be explicitly stated that NRC is required, prior to issuance of an export license, to determine that adequate measures have been or will be taken to protect against harm to the health and safety of the public and to the environment.

(d) Consideration Should be Given to Relating United States Safeguards Requirements to International Safeguards Requirements -- The Bill as drafted represents essentially an unilateral approach to the safeguards problem. It will thus undoubtedly be criticized on the grounds that it represents a form of "nuclear imperialism" and that generally agreed upon international safeguards criteria are much more palatable to foreign countries than are criteria unilaterally required by the United States. Moreover, the argument will be made that, in the long run, as more and more countries become

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32/ In this regard, it should be noted that ERDA has recently moved in the direction of establishing physical security requirements over exports at least of strategic quantities of uranium enriched to greater than 20% in the isotope U-235, plutonium, and U-233. ERDA Interim Analysis 106. Such policy does not extend, however, to low enriched uranium or to the reprocessing and fabrication of spent reactor fuel. Moreover, the policy only requires that recipient countries establish "a system of physical security measures acceptable to the United States", ERDA Interim Analysis 106 (emphasis added), and thus there is no assurance that such system of physical security actually be adequate to prevent the theft or sabotage of special nuclear material by sub-national groups. Finally, no physical security measures are required to protect against diversion by the recipient country itself.

capable of supplying nuclear power generating systems and nuclear fuels, an international safeguards system which is truly universal will best protect against diversion risks. Because there are benefits in having an adequate international regime for regulation of the nuclear fuel cycle, the environmental groups would suggest that the Committee give some consideration to development of a scheme which would relate standards developed within the United States to standards which might subsequently be developed internationally. 33/ Under such a scheme, NRC would still be required to promulgate and impose its own safeguards standards. If, thereafter, a multilateral agreement could be worked out, containing "substantially equivalent" standards, then, in any particular case, the U.S. unilateral safeguards could be replaced by those agreed upon multilaterally, provided that the adoption of the multilateral accord would not impair the United States' right to impose more stringent standards on a recipient country. Hopefully, the United States' move to act unilaterally in the absence of international agreement would stimulate the international community itself to establish an appropriate safeguards scheme. This approach would be consistent with the objectives of the Bill "that commercial nuclear exports by the United States should be made in the context of meaningful international controls" [Section 2(a)(8)].

33/ A precedent for such an approach may be found in the Ports and Waterways Safety Act of 1972, Pub. L. No. 92-340, 86 Stat. 427, 46 U.S.C. §391a (July 10, 1972), governing the regulation of oil tankers. That Act, however, is deficient insofar as it does not, over a long interim period, require the U.S. standards to be put into force in the absence of an international agreement. Further, its language may not be strong enough to ensure that the United States will put such standards into force if international regulations are inadequate. These deficiencies, of course, would have to be remedied in any legislation governing the nuclear export process.

(e) Provision Should be Made for Appropriate Public Participation in the Export Licensing Process -- As noted above, one problem with the nuclear export licensing process in the past has been that interested persons, with the exception of the license applicant, have not been notified as to the pendency of license proceedings, and, because of the ministerial nature of the review, they have had no opportunity to appear and present views with regard to prospective licenses. S.1439 does not alter this pattern of exclusion of public participation in the export licensing process, and, indeed, may aggravate this particular procedural infirmity to the extent that it may make the Secretary of Commerce's licensing function ministerial, subject to receipt of certification by other agencies, which, themselves, do not get input from the public in making their determinations. We suggest that public procedures are important and should be provided for in the following proceedings:

(1) In the licensing proceedings under Sections 53(a), 62, 82(c), 103 and 104 of the Atomic Energy Act, the Bill should make clear that licenses will only be issued after full administrative review, including public notice of and public hearings, on individual license applications.

(2) In the establishment by NRC of safeguards criteria [Section 7(b)], provision should be made to ensure that such criteria are developed in an open decisionmaking process after substantial public debate, i.e., developed in the context of a formal rulemaking proceeding.

(3) In the development and consideration of the nuclear proliferation assessment statement [Section 8(a)] such statement, to the extent feasible, should be circulated to the public for comment.

(f) The Role of the Arms Control and Disarmament Agency in the Export Process Should be Expanded -- The Arms Control and Disarmament Agency ("ACDA") is presumably the agency within the federal government with the most expertise concerning the political risks of nuclear proliferation. By contrast, NRC's primary expertise relates to the physical aspects of the proliferation problem, i.e., how to account for nuclear materials or provide for physical security. It thus makes sense in Section 8 of the Bill to expand the role of ACDA and give it greater responsibility in decisions to enter into Agreements for Cooperation or issue export licenses. As currently drafted, it is not clear just how the nuclear proliferation assessment statement will be used in the licensing process, and merely offering ACDA the opportunity to comment on proposed licenses [Section 8(b)] does not ensure that ACDA will in fact participate in the licensing process. Thus, we suggest that it might be more appropriate to have ACDA itself prepare the nuclear proliferation assessment statement and to require that that statement be given consideration, together with economic, technical and other factors, in the licensing process. 34/ Such an appropach would ensure that ACDA's evaluation of a proposed project is before NRC (or other responsible agencies) before decisions are made to authorize nuclear exports.

34/ To avoid any contrary implications as, for example, with regard to the application of the requirements of the National Environmental Policy Act of 1969, it should be made clear that preparation and consideration of the nuclear proliferation assessment statement is "in addition to all other evaluations, assessments and reviews required by law."

(g) The Training Program Established by NRC Should Include Health, Safety and Environmental Controls -- The training program provided for in Section 7(c)(1) of the Bill provides for training in "the most advanced techniques and technology for materials accounting and physical security". Speaking on behalf of environmental groups, I would also urge that consideration be given to establishing and operating a training program in the area of health, safety and environmental control. The regulatory problems associated with fission power development are not just those of safeguards. The competency of local regulatory authorities, especially in developing countries without previous experience in the fission power area, is essential to ensuring that nuclear power generating systems are constructed and operated and nuclear fuels and associated radioactive wastes are used, transported and managed in such a manner so as to eliminate or reduce environmental risks. A training program in the United States would be of great importance in achieving this goal.

(h) Safeguards Studies Under the Bill Should be Coordinated with Other Federal Studies -- The study provided for in Section 9(a)(1) of the Bill appears to overlap to some extent with the study mandated last October by the Export Administration Act Amendments of 1974. 35/ The Export Administration Act study is due to be

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35/ Section 14 of the Export Administration Act Amendments of 1974, Pub. L. No. 93-500, 88 Stat. 1552 (Ocober 29, 1974), calls upon the President

[footnote continued on page 26.]

released shortly, and, in order to avoid any redundancy of effort, it might make sense to limit the NRC study under Section 9(a)(1) of the Bill to issues not covered by the Export Administration Act study or to follow up questions raised as a result of such study. 36/

IV. Conclusion

In conclusion, we believe that Congress is moving in the right direction with legislation such as S.1439. It is critically important that Congress follow up on the wise choices made in the Energy Reorganization Act of 1974 to separate promotional and regulatory functions in the area of nuclear exports and to vest control over safeguards and other regulatory considerations in an

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35/ continued from page 25.

> "to review all laws, regulations issued thereunder by the Atomic Energy Commission, the Department of Commerce, and other Government agencies, governing the export and re-export of materials, supplies, articles, technical data or other information relating to the design, fabrication, development, supply, repair or replacement of any nuclear facility or any part thereof, and to report within six months to the Congress on the adequacy of such regulations to prevent the proliferation of nuclear capability for nonpeaceful purposes. The President is also directed to review domestic and international nuclear safeguards and to report within six months to the Congress on the adequacy of such safeguards to prevent proliferation, diversion or theft of all such nuclear materials and on efforts by the United States and other countries to strengthen international nuclear safeguards in anticipation of the Review Conference scheduled to be held in February 1975 pursuant to Article VIII, section 3 of the Treaty on the Non-Proliferation of Nuclear Weapons."

36/ As to the other study mandated by the Bill, that dealing with "internationalization" of the fuel cycle [Section 9(b)(1)], the environmental groups strongly believe that there is an urgent need for such a study. Internationalization may, in the long run, prove to be the only satisfactory way of bringing the nuclear fuel cycle under effective control, and it is important to begin to assess fully the risks and benefits of such an approach.

independent licensing or certifying agency with expertise in nuclear power. Unless the United States takes the lead now in placing adequate controls over the international fuel cycle, it may well be too late to protect the United States and the world community from an ever increasing threat of nuclear disaster.

Thank you.

Appendix to Testimony of

ELDON V. C. GREENBERG

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August 15, 1974

Dr. James L. Liverman
Assistant General Manager for
Biomedical and Environmental
Research and Safety Programs
United States Atomic Energy Commission
Washington, D.C. 20545

Environmental Impact Statement on
International Nuclear Power Program

Dear Dr. Liverman:

In response to the Notice published in the Federal Register on June 14, 1974 (39 Fed. Reg. 20835), regarding the preparation by the United States Atomic Energy Commission (the "Commission") of an environmental impact statement (the "Programmatic Statement"), pursuant to Section 102(2)(C) of the National Environmental Policy Act of 1969, 42 U.S.C. § 4332(2)(C) ("NEPA"), on the International Nuclear Power Program (the "Program"), we are writing on behalf of the Sierra Club, the Environmental Defense Fund ("EDF"), the National Parks and Conservation Association ("NCPA"), the Natural Resources Defense Council ("NRDC"), and Friends of the Earth ("FOE") to present their suggestions for consideration in connection with preparation of the Programmatic Statement. We have acted as counsel for all the groups (except FOE) in the litigation which has led to the preparation of the

Programmatic Statement (Sierra Club, et al. v. United States Atomic Energy Commission, et al., D.D.C., Civil Action No. 1867-73), and we have been asked by them to coordinate the presentation of their comments.

The environmental groups are all non-profit membership organizations deeply concerned and knowledgeable about the environmental consequences of fission power. Their combined membership exceeds 275,000 persons throughout the United States and abroad.[1] They have taken an active role in the public debate surrounding the growth of commercial fission generating capacity by means of litigation, testimony, comments to regulatory bodies, and informational and educational programs designed to provide the public with data relevant to environmental issues posed by fission power development and to stimulate informed public discussion with respect to such issues. And, in particular, they have been concerned with the international environmental implications of the spread of fission power as an energy source.

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[1] The Sierra Club, whose principal place of business is at 220 Bush Street, San Francisco, Calif. 94104, has a membership of approximately 1[illegible],000 persons, including persons residing in 67 foreign countries. EDF, whose principal place of business is 162 Old Town Road, East Setauket, N.Y. 11733, has a membership of approximately 40,000 persons and a 700 member Scientists' Advisory Committee, including members residing in 18 foreign countries. NPCA, whose principal office is 1701 18th St. N.W., Washington, D.C. 20009, has a membership of approximately 45,000 persons, including members residing in 36 foreign countries. NRDC, whose principal office is at 15 West 44th St., New York, N.Y. 10035, and has additional offices in Washington, D.C. and Palo Alto, Calif., has a membership of approximately 21,000 persons, including members residing in eight foreign countries. FOE, whose principal place of business is 529 Commercial St., San Francisco, Calif. 94111, has a membership of 27,000 persons and is affiliated with "sister organizations" in ten foreign countries.

We believe that the importance of the Commission's endeavor cannot be overemphasized. It comes at a time when the wisdom of a commitment to fission power as an energy source has been called increasingly into question[2] and when recent events, most notably the tests of nuclear explosive devices carried out by India in May 1974, and the promises made in June 1974, by ex-President Nixon to supply nuclear power generating systems and enriched nuclear fuels to Egypt and Israel, have alerted the Congress and the public to the problems associated with the spread of fission power.

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[2] As the Commission is aware, at the Twenty-Third Pugwash Conference on Science and World Affairs, held in Aulanko, Finland, from August 30 through September 4, 1973 -- a conference attended by 108 distinguished scientists from twenty-nine countries and six international organizations -- a working group assigned to deal with the problem of "Radioactive Pollution of the Environment in the Context of the Energy Problem", issued a Report evaluating the problems of and alternatives to fission energy. This Report reached the following basic conclusion:

> "Owing to the potentially grave and as yet unresolved problems relating to waste management, diversion of fissionable material, and major radioactivity releases arising from accidents, natural disasters, sabotage or acts of war, the wisdom of a commitment to nuclear fission as a principal energy source for mankind must be seriously questioned at the present time."

The Continuing Committee of Pugwash adopted the same basic conclusion, further emphasizing that:

> "Every effort should be made to develop alternatives [to fission power] by greatly accelerating research on potentially cleaner energy sources, and by reexamining the relation between genuine, substainable needs for energy on the one hand, and projected demands on the other. In the meantime, every effort should be made to minimize by technical and regulatory means the hazards of fission...."

The need for a comprehensive Programmatic Statement, treating all aspects of federal agency action to authorize, assist, support, and encourage the export of fission power generating systems and nuclear fuels has furthermore been eloquently expressed during the debates in both the House and the Senate with regard to proposed amendments to Section 123 of the Atomic Energy Act of 1954, 42 U.S.C. § 2153, to vest veto power in Congress over Agreements for Cooperation Concerning Civil Uses of Atomic Energy ("Agreements for Cooperation"). As Senator Jackson, the sponsor of NEPA, stated during the debate on the Senate version of this bill, S. 3698,

> "It is evident that the time is ripe for a searching and careful review of our programs for the export of nuclear technology and for a fundamental analysis of the risks and benefits associated with these programs. Accordingly, I was pleased to note in the June 14 *Federal Register* that the Atomic Energy Commission has announced that it is preparing an environmental impact statement on its International Nuclear Power Program. Hopefully, this study in the context of the export of nuclear technology will weigh carefully the alternatives to nuclear power, its economic advantages and disadvantages, and will assess the magnitudes of the inherent risks associated with the proliferation of nuclear technology, such as the standards to be applied in foreign countries for reactor construction and operation, the potential for diversion of fissionable material by national and subnational groups, and all measures which are essential to prevent the use of nuclear fission by participants in the Program for destructive uses." 120 *Cong. Rec.* S. 12115 (July 10, 1974).

Similarly, Senator Edward Kennedy of Massachusetts stressed,

> "Each of these recent events must lead to a simple conclusion: that the continuing transfer of nuclear technology, ostensibly for peaceful purposes, has raised grave issues that must be thoroughly debated

> by the Congress and the American people. These issues are too important to be decided by one branch of Government alone. They are too important to be decided on a business as usual basis. Secretary of State Kissinger has rightly called for a national debate on the major issues of our nuclear relations with the Soviet Union. But at the same time, there must be a national debate on the whole range of issues that relate to the deadly spread of nuclear weapons around the globe." 120 *Cong. Rec.* S. 12115 - S.12116 (July 10, 1974).[3]

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[3] In addition to the overall and general analysis which should be contained in the Programmatic Statement, it is apparent that searching, in-depth individual analyses should be made of the potential impacts of and alternatives to the newly proposed Middle Eastern agreements. As stressed in our letter of July 2, 1974, to Dr. Dixy Lee Ray, "Examination of these risks and their potential adverse consequences simply cannot await preparation of or be subsumed within the Programmatic Statement." Similar sentiments were expressed by Senator Jackson during the floor debate on S. 3698:

> "The specific sales of nuclear power reactors to Egypt and Israel must receive special and individualized analysis, discussing, at a minimum, the issues involved in any general analysis." 120 *Cong. Rec.* S. 12115 (July 10, 1974).

In this context, we would emphasize that the preparation and consideration of the Programmatic Statement can in no way be deemed to relieve the Commission of its obligations under NEPA to prepare environmental impact statements covering individual actions whose environmental impacts are not adequately dealt with in the Programmatic Statement itself. *Cf. Scientists' Institute for Public Information, Inc. v. Atomic Energy Commission*, 156 U.S. App. D.C. 395, 481 F.2d 1079 (1973); Council on Environmental Quality, *NEPA Guidelines*, 40 CFR § 1500.6(d)(1).

The need for and importance of the Programmatic Statement is further underscored by the profound ethical and social implications of the spread of fission power. As has been emphasized by Alvin Weinberg, in his widely-cited article, "Social Institutions and Nuclear Energy", *Science*, July 7, 1972, at 27, whatever the benefits that may be associated with the production of electrical energy by nuclear fission, these benefits can only be achieved at the cost of a "Faustian bargain with society", which will demand "both a vigilance and a longevity of our social institutions that we are quite unaccustomed to".1/ The United States is perhaps in the unique position of being able to advise those who seek to "go nuclear" of the risks and benefits of this source of power. Prospective foreign purchasers of United States fission power generating systems and nuclear fuels may not have the technical or regulatory sophistication necessary to understand fully all the implications of their choices. Further, in many countries information with respect to nuclear power development, even though in the hands of the government or private contractors, may not be available to the public

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1/ This nuclear world in which "no acts of God can be permitted", Hannes Alfven, "Energy and Environment", *Bulletin of Atomic Scientists*, May 1972, at 5, has been commented upon by others. See, *e.g.*, Hannes Alfven, "Fission Energy and Other Sources of Energy", *Science and Public Affairs*, January 1974, at 4; Allen Kneese, "The Faustian Bargain", *Resources*, No. 44, September 1973.

generally, and there may be no opportunity for the public to participate in licensing or other regulatory proceedings. The Commission has a fundamental moral obligation to make up for these deficiencies and to discuss fully, and with the utmost candor, the risks and benefits, both in the short and long terms, of fission power and its alternatives.

In light of the seriousness of the issues before the Commission, the Congress, other agencies, and the public, we believe that a substantial level of effort, in terms of personnel, time, and money, must be devoted to this project. The Commission must take all necessary steps to ensure that all relevant information and points of view, including responsible opposing views, are fully, fairly, and openly presented in the Programmatic Statement.[5] And, it must seek to prepare a draft Programmatic Statement which, in accordance with Section 1500.7(a) of the NEPA Guidelines, will "fulfill and satisfy to the fullest extent possible at the time the draft is prepared the requirements established for final statements by Section 102(2)(C)." Only in this way will Congress, other agencies, and the public have before them an adequate vehicle for eliciting informed comment on the Program which can be factored into the final decisionmaking process.

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[5] See Council on Environmental Quality, NEPA Guidelines, 40 C.F.R. § 1500.10(a).

In the remainder of this letter we will discuss general areas of consideration which we believe should be included in the Programmatic Statement, focusing upon the description of the program, its impact, alternatives to it and any cost-benefit analysis made of it. Our suggestions are based upon NEPA's requirements but are not intended to be comprehensive, and we recommend that the Commission go beyond such suggestions to the fullest extent possible.

I. Description of the International Nuclear Power Program

The draft Programmatic Statement should contain a thorough description of the Program. 6/ This discussion should begin by defining what the Program is, that is, what agency actions are covered, and by explaining in general terms the nature of the equipment, materials, and fuels which are or may be exported under the Program. It should discuss the objectives of the Program at the time it was initiated and describe how such objectives may have changed over the years in light of the development of the Program and/or the proliferation of nuclear weapons capability, and whether they remain valid today. It should then detail the complete history of the Program since its inception, setting out the agreements entered into, com-

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6/ See Council on Environmental Quality, NEPA Guidelines, 40 C.F.R. § 1500.8(a)(1).

mitments made, and actual exports of technology, equipment, and fuel over the past twenty years, together with a discussion of the safety, health, and environmental reviews which have been undertaken. Finally, it should discuss the effect private contractual commitments may have on federal agency actions.

(a) Nature, Size and Projected Growth of Program

At the outset, the Programmatic Statement should describe the various types of fission reactors which have been or may be involved in the Program (light water reactors, high temperature gas gooled reactors, liquid metal fast breeder reactors, etc.) and the types of fuels which have been or may be involved in the Program (enriched uranium, plutonium, etc.). The differing characteristics of each of these reactor and fuel types should be identified, and their relative importance in the Program noted.

The Commission should then convey to the reader a general sense of the size of the Program. Current figures with respect to fission generating capacity (including numbers and types of reactors, their locations, total megawattage, manufacturers, and so forth) worldwide should be given, as well as a list of the numbers, types, generating capacities, manufacturers, and locations of all fission reactors currently on order or under construction. The relative share of the exporting countries (USA, France, West Germany, Canada, Great Britain, USSR) of the world market should be given. Similar figures should be developed for each sector of the fuel cycle, i.e., the provision of raw uranium, enrichment services, fuel element fabrication, reprocessing, etc. The Commission, in other words, must show the contribution to date of this country and other countries in raw materials, services, and equipment to the worldwide market for fission power generating systems. Finally, electrical energy output from fission power should be compared to that provided by other sources on a country by country, regional and worldwide basis.

Having described the current market, an effort must be made, assuming continuation of the Program, to project the growth of the world market on a country by country, regional and worldwide basis. It would appear appropriate in this regard to provide high, intermediate, and low growth scenarios. The Programmatic Statement should identify the factors, including possible governmental actions, both nationally and internationally, that might influence the rate of electric output growth and development of fission power generating systems; should discuss the assumptions underlying the various scenarios; should identify the scenario that it considers to be most likely; and should provide the reasons for this judgment.

The Commission should identify the number of facilities and the capacities in each sector of the fuel cycle on a country by country, regional and worldwide basis in the years 1974 - 1980, 1990, 2000, 2010, and 2020, under various electrical energy growth assumptions or scenarios, indicating again the extent to which foreign manufactured reactors, foreign produced fuels and foreign provided services will make up part of the market in such years. To the extent possible, the impact of the introduction of the breeder reactor and plutonium recycling[7] should be factored into this analysis. Further, the relative proportion of electrical energy produced by fission power to that produced by other sources (fossil fuel, geothermal, solar, etc.) should be set out.

(b) Legal Structure of the Program

The initial section of the Programmatic Statement should describe in detail four basic elements in the nuclear power export process and the way in which these elements fit together:

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[7] In this regard, the failure of the United States at this time to have an operational reprocessing industry, see e.g., The New York Times, July 24, 1974, at 62 (discussing the "inoperability" of the Morris, Illinois reprocessing facility), should be noted, and its impact on development of a plutonium recycling economy and future purchases of light water reactors, utilizing enriched uranium fuel, assessed. The question must be asked: If U.S. enrichment capacity is not available -- see Statement of Dr. Dixy Lee Ray before the Joint Committee on Atomic Energy, Hearings on Uranium Enrichment, August 6, 1974 -- and if reprocessing capacity is not available in this country and European capacity is also limited -- the Eurochemic Plant at Mol, Belgium, for example, is shutting down because of uneconomic operation, see Dreschhoff, Saunders, and Zeller, "International High Level Nuclear Waste Management", Science and Public Affairs, January, 1974, at 28, 29 -- will continued purchases of light water reactors make economic sense?

(1) Negotiation of and entry into bilateral Agreements for Cooperation pursuant to Section 123 of the Atomic Energy Act of 1954, as amended, 42 U.S.C. §2153. This discussion should include a list of the countries which have entered into such Agreements with the United States to date, and analyze the basic provisions of such Agreements, specifically noting the amount of enriched nuclear fuel authorized for export thereunder, and relating such amounts to the Commission's contractual commitments and its assessment of the realistic needs of such countries over the term of the Agreements. It should further explain the process by which such Agreements come into force and describe, in particular, the role of the Commission and the Department of State in the negotiation process, the role of the President and Congress in reviewing such Agreements, the extent to which Congress has been able to be an active participant in the process, and the nature and scope of information provided to Congress in the past with respect to such Agreements.

(2) The entry into contracts by the Commission, pursuant to Sections 54 and 61 of the Atomic Energy Act of 1954, 42 U.S.C. §§2074, 2201(t), to provide enriching services for nuclear fuels. This discussion should set out a list of contracts entered into to date and all pertinent data with

respect thereto and contain a description of the process by which such contracts are negotiated. Enrichment commitments should be related to existing and planned U.S. enrichment capacity (with and without the assumption of plutonium recycling).

(3) Financing of nuclear power exports by the Export-Import Bank of the United States ("Eximbank") acting under the Export-Import Bank Act of 1945, 12 U.S.C. §635 s/. This discussion should contain a complete list of all financing arrangements entered into to date and all pertinent data with respect thereto, and contain a description of the process by which such arrangements are entered into. Further, it should detail any specific incentives which Eximbank offers, i.e., life of the plant fuel financing commitments, to encourage the purchase of U.S. fission power generating systems and nuclear fuels.

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s/ There is no question that any adequate analysis of the Program must include the element of financing. Financing is an integral part of the export process and, indeed, the process may not go forward unless financing is available. As of December 31, 1973, Eximbank financing had been or was being provided for 73% of all U.S.-built nuclear power plants exported or expected to be exported at such date, while Eximbank financing has been provided for more than 35% of the Commission's fuel enrichment service contracts. See Eximbank's and the Commission's Answers to Interrogatories, dated February 15, 1974, in Sierra Club, et al. v. United States Atomic Energy Commission, et al. (D.D.C., Civil Action No. 1867-73). As Judge Gasch indicated in his Opinion of August 2, 1974, in Sierra Club, et al. v. United States Atomic Energy Commission, et al., the Commission has a plain responsibility under NEPA to insure that an element such as financing, even though carried out by another federal agency, is properly included in the Programmatic Statement.

(4) The licensing by the Commission of the export of fission power generating systems, pursuant to 42 U.S.C. §2133, and the licensing of the export of special nuclear materials, pursuant to 42 U.S.C. §2073. This discussion should contain a complete list of licenses entered into to date and should describe the regulatory procedures followed by the Commission in licensing proceedings.

In discussing the elements of the Program, the Programmatic Statement should indicate the amount and nature of interagency consultation in decisionmaking and the relative time sequence of each step in the overall process. To the extent that some actions may occur outside a normal sequence, i.e., financing of a reactor export prior to entry into an Agreement for Cooperation 9/, the reasons for and significance of this pattern should be examined and its impact on the commitments of other agencies assessed.

9/ For example, in July 1974, Eximbank authorized financing to support the export of nuclear power generating systems and enriched nuclear fuels valued at $176 million to Yugoslavia, although the United States has no Agreement for Cooperation with that country. See Eximbank, News Release, July 8, 1974.

(c) Scope of Reviews Undertaken

With respect to each element of the Program, the Programmatic Statement should specify the nature and scope of the reviews undertaken by the responsible agencies. The Commission should detail the type and amount of data it and other responsible federal agencies receive from foreign countries with respect to their overall program for the development of nuclear power and with respect to individual projects for which United States assistance is sought, specifically noting what data is required to be submitted prior to action being taken and what follow-up reporting requirements, if any, must be met after action is taken. Additionally, it should be stated whether any written reports, analyses or assessments are prepared by or for the responsible agencies with regard to (1) environmental, health, safety, and safeguard regulation of the nuclear power fuel cycle by governmental bodies in any country in which U.S. supplied fission power equipment and/or fuels are used; and (2) any differences between such regulation and regulation of the nuclear power fuel cycle in the United States.

(d) Effect of Private Contractual Commitments

The description of the Program should contain an analysis of the extent to which private contractual relationships may affect decisions made by the Commission or other responsible federal agencies. Private industry in the United States should be canvassed for its contracting practices and such questions answered as whether fuel fabrication or other supply contracts between U. S. manufacturers and foreign utilities require reprocessing of "spent" fuel elements in U.S. reprocessing facilities, whether private contracts for the sale of fission power generating systems are contingent on Eximbank financing, and so forth.

II. The Environmental Impact of the Proposed Action (Section 102(2)(C)(i) of NEPA)

Under this heading, the Programmatic Statement should discuss the impact of the Program wherever it occurs, on an individual and cumulative basis, throughout the nuclear power fuel cycle. This means that there must be a discussion, either in the body of the Programmatic Statement or in separate appendices, of the specific impacts of nuclear technology on country by country and regional bases, together with a discussion of the cumulative implications of a worldwide commitment to fission power as a source of electrical energy. In setting out the impact of the proposed action, the Programmatic Statement should describe each major segment of the nuclear power fuel cycle, as it now is constituted and as projected through 2020, utilizing various energy growth assumptions; the regulatory scheme, both national and international, governing each segment; and the outputs of each segment in each of such years under such electrical energy growth assumptions. Finally, the Programmatic Statement must treat in depth the specific risks associated with the growth and output of fission power.

(a) The Nuclear Power Fuel Cycle

With regard to the nuclear power fuel cycle, the Programmatic Statement should describe each step in the production of electrical energy from fission reactors, including:

(1) mining and milling of uranium; (2) fuel refining, conversion, and fabrication; (3) fuel enrichment; (4) reactor operation; (5) reprocessing; (6) waste storage and disposal; and (7) transportation of nuclear materials between different sectors in the fuel cycle. The Commission's discussion of these elements of the fuel cycle must not be limited to those which occur solely within the united States, but rather must treat them wherever they occur.[10] Thus, if for example, fuel used in a United States manufactured light water reactor is reprocessed at a reprocessing facility in Western Europe, rather than at a reprocessing facility in the United States, the impact, individually and cumulatively, of the Western European facility should be considered. Conversely, even though the United States may not export reprocessing facilities or reprocessing technology, if fuels utilized in U.S. supplied fission power generating systems are or may be reprocessed within the United States, this impact must be dealt with. Particular attention should be paid to transnational impacts, such as those associated with the international transportation of nuclear materials, as well as with national practices, i.e.,

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[10] See Council on Environmental Quality, NEPA Guidelines, 40 C.F.R. § 1500.8(a)(iii)(A), calling upon agencies to assess "the positive and negative effects of the proposed action as it affects both the national and international environment."

dumping of low level (or high level) radioactive waste products in the ocean, which may have international consequences. Finally, variations in the fuel cycle for different types of generating systems should be assessed, and related to the current composition of the Program (in terms of reactor type) and to its projected growth.

(b) The Regulatory Framework

In discussing the environmental impact of the Program, it is important to focus on the regulatory frameworks surrounding fission power development. In this regard, the Commission should specify the nature and scope of the health, safety, environmental, or safeguard standards, policies and practices, both national and international (including any imposed by the United States), now applicable to the construction and operation of United States supplied fission power generating systems and to the use, transportation, and management of U.S. supplied nuclear fuels and associated radioactive wastes. In a survey of the regulations, policies and practices of recipients and potential recipients of United States fission power generating systems, as well as those of the appropriate international bodies, especially the International Atomic Energy Agency (the "IAEA") and Euratom, as they relate to all aspects of the fuel cycle, such matters as the comprehensiveness of the regulations; adequacy and effectiveness of environmental, health, safety, and safeguards programs; experience, competency and size of the regulatory staff; public access to regulatory procedures and to information with regard to fission power development generally; and adequacy of budgetary allocations should be assessed.

In order to analyze the effectiveness of regulatory frameworks, some attention should also be given to the occurrence of incidents in the past in particular countries or regions and the likelihood that such incidents may occur again. For example, the existence of any past terrorist incidents against nuclear facilities should be noted[11/], the reasons for such incidents analyzed, and the possibility of any such future incidents projected. Similarly, reactor malfunctions, radiation leaks, etc. occurring abroad should be noted and related if possible to particular regulatory and/or environmental problems in the country in which such incidents occurred.[12/] Finally, special attention should be given to specific

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[11/] See, *e.g.*, 120 *Cong. Rec*. S. 11503 (June 25, 1974) (discussion of safeguard failures, including an attack, in March 1974, by a guerilla band, on the Attucha facility in Argentina).

[12/] See, *e.g.*, The *Washington Post*, February 25, 1974, A-2, col. 1 (discussion of breakdown at nuclear facility near Hanover, Germany); The *New York Times*, June 9, 1974, at 4, col. 1, (discussion of accident at Windscale Atomic Energy Plant, Great Britain). Mention might also be made of the reported erosion of pipes and the collapse and bowing of fuel rods in the Mihama I pressurized water reactor in Japan, which have resulted in radioactive leakage and plant shutdowns.

national practices which may pose environmental, health, safety, or safeguard problems and are currently not subject to any standards imposed internationally or by the United States.13/

(c) The Outputs from the Fuel Cycle

Employing the growth scenarios outlined at page 10, *supra*, the Programmatic Statement should set forth the outputs, on individual facility, country by country, regional, and worldwide bases, in each sector of the nuclear power fuel cycle. Cumulative totals in each of the years 1974-1980, 1990, 2000, 2010, and 2020, as well as annual rates should be presented, and their impact on health and environmental quality in the particular areas directly affected, as well as worldwide, assessed. Outputs discussed should include, but not be limited to, mining and milling tailings, electricity (both produced by and necessary to support fission power generating systems),

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13 For example, it should be noted which, if any, of the recipients of the U.S. supplied fission power generating systems and nuclear fuels have disposed of or may dispose of waste products by dumping them into the oceans, and the environmental soundness of this, as well as other practices different from those engaged in in the United States, should be assessed. By the same token, it would be appropriate to assess differing population density criteria employed in various foreign countries, as well as any differing criteria for such design factors as emergency core cooling systems.

The Programmatic Statement should also disclose what design features or environmental, health, safety, or safeguards criteria, deemed advisable in this country, have not been adopted by foreign purchasers of United States fission power generating systems and nuclear fuels, specify the reasons for the decision made, and quantify to the extent possible the increased risk assumed as a result of such decision operational radioactive effluents, thermal (waste heat) discharges, plutonium, and fission products.

(d) Specific Risks

Having described in general terms the growth and output of the nuclear power fuel cycle, the specific risks associated with such growth and output must be evaluated. This discussion should, among other matters, provide an informative representation of the hazards and uncertainties associated with the biological and radiological properties of plutonium and the principal fission products produced in fission reactors. It should further recognize that environmental hazards or risks associated with the technology are those associated with its misuse as well as its proper use. Therefore, the consequences of utility or manufacturer negligence and accidents; theft and hijacking of plutonium; nuclear proliferation and associated national security dangers; damage to power plants, fuel facilities, spent fuel shipments, and waste repositories by deranged or violently anti-social individuals or terrorist groups; and similar scenarios should be dealt with in the draft. In each case the Programmatic Statement should quantify, to the fullest extent possible, the environmental costs of the Program in the countries which are or may be recipients of U.S. supplied fission power generating systems and nuclear fuel, in the United States itself, and in the international community generally (i.e., effects on ocean fish catches due to increased releases of radioactive effluents into the oceans). It should also clearly describe the Commission's view and other responsible opinion with respect to (1) the consequences should such an incident occur; (2) actions that have been taken to date, both nationally and internationally, to prevent such an occurrence or lower the risk to an acceptable level; (3) the deficiencies in the current Program; (4) proposed steps that will or could be taken to reduce the risks (including an indication of what steps are not being taken and why they are not being taken); and (5) the cost, including financial and social cost, of implementing these steps. In particular, the Programmatic Statement should focus upon the following major problems:[14]

(1) The Major Accident Problem -- For each stage of the fuel cycle discussed above, the Programmatic Statement should assess the problem of a major accident that could release substantial quantities of radioactive material into the environment. It should indicate precisely the kinds of accidents that could conceivably occur, the events that could lead to their occurrence, the range of possible effects of such accidents (including loss of life and property damage), and the steps that are being taken to prevent or minimize the possibility of such an accident. A thorough discussion of the present status of reactor safety research and the adequacy of

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[14] In addition to the specific risks set out below, to the extent possible, in this section, the Commission should also treat direct land use impacts of fission power development.

emergency core cooling systems, including the spectrum of responsible opinion regarding the safety of current light water reactors, should be given in this section.15/ Particular attention, moreover, should be given to the geographic scope of the consequences of major accidents, including the dispersion of radionuclides in the oceans and atmosphere, at current or projected sites of United States manufactured fission power stations abroad.

(2) The Plutonium Diversion and Safeguards Problem -- The draft Programmatic Statement should discuss the general dimensions of the plutonium diversion problem; indicate what people or groups (both national and subnational) would want to divert plutonium for unauthorized purposes and for what reasons; describe how a plutonium "black market" might operate; discuss how diversions might be attempted or accomplished; identify the stages of the nuclear power fuel cycle at which such diversion is possible or most likely, indicating the quantities of fissionable material subject to diversion at each such stage; describe the weapons that can be made with plutonium; describe the

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15/ It would also be appropriate in this section to set out objections on safety grounds which various foreign countries have expressed with regard to United States manufactured light water reactors. Particular reference should be made to the conclusions of the Select Committee on Science and Technology of the House of Commons of Great Britain, issued in January 1974. See "The Choice of a Reactor System", The Select Committee on Science and Technology, Energy Resources Sub-Committee, Session 1973/1974. The debates in the Swedish Parliament on May 15, 1973, and Sweden's decision not to expand further its fission power program deserve mention as well.

effects of the unauthorized existence and the use of such weapons in relevant contexts; and state specifically the maximum level of plutonium diversion and unauthorized use the Commission considers to be acceptable, as well as the level it and other responsible spokesmen consider to be most likely. Potential new members of the "nuclear weapons club" should be identified, and the likelihood of their diversion of plutonium from U.S. supplied reactors, given current safeguards programs, perceived national security needs, and societal constraints, assessed. The Programmatic Statement should also discuss what measures are and will be taken by the Commission, by the IAEA, and by other national and international authorities to minimize the risk of illegal diversion, assessing specifically the current safeguards programs under the Treaty on the Non-Proliferation of Nuclear Weapons, and what steps would be taken in case of (i) illegal diversion, (ii) threatened use of a plutonium weapon, and (iii) actual use of a plutonium weapon. This discussion should provide an estimate of the financial cost of national and international safeguards programs considered adequate by the Commission or other responsible spokesmen, indicate who would bear these costs, and compare these costs to the costs to society should safeguards programs fail. Because the recent proposals to enter into Agreements for Cooperation with Israel and Egypt have raised in their most dramatic form the safeguards problems associated with the export of fission technology and fuels, special attention must be given in the Programmatic Statement to particularized safeguards problems in areas subject to political instability, chronic warfare, or terrorist activity (and, indeed, in any area where countries do not now possess nuclear weapons), *i.e.*, the Middle East, Latin America, and efforts which have been or can be made to minimize risks in such areas.

(3) *The Long Term Containment Problem* -- The Programmatic Statement should analyze and discuss the problems presented by the long-lived character of radioactive fission products and plutonium and the importance of preventing these materials from entering the biosphere. The current status and adequacy of waste storage programs, both in the United States and abroad, should be assessed. Particular attention should be given to high level nuclear waste management practices and proposals outside the United States which have recently been described as "a modern day Tower of Babel."[11] It is important to recognize both the nature and magnitude of the problem by describing the physical and chemical properties of the radioactive waste products which are created through the fission process, their toxicity and half lives, and the kind of containment which is needed to prevent them from entering the biosphere. Projections should be made as to the amount

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[11] See Dreschhoff, Saunders, and Zeller, "International High Level Nuclear Waste Management", *Science and Public Affairs*, January 1974, at 28; see also OECD/IAEA, *Management of Radioactive Wastes from Fuel Reprocessing* (1972); Rose and Tenaglia, "Technical and Social Aspects of Nuclear Waste Disposal in Western Europe", *Ambio*, Vol. 2, No. 6, 233 (1973).

(measured in curies, gallons, and cubic feet) of high level radioactive wastes which will be accumulated by each of the years 1974-1980, 1990, 2000, 2010, and 2020, in this country and elsewhere, specifically noting the source of such wastes (i.e., how much of the waste stored in the United States will be attributable to fuels used in foreign reactors), and evaluating the risks associated with the escape of even a tiny fraction of the amount of accumulated radioactivity in each of such years. The Commission, lastly, should describe its current policies and practices with respect to the reprocessing and waste storage of fuels used in U.S. supplied fission power generating systems, and should deal, in particular, with the incremental impact of any increased waste storage burden which might be imposed upon the United States by agreements to reprocess foreign fuels in this country. 17/

(4) The Cumulative Release Problem -- In the discussion of cumulative risks, the Commission should examine long term somatic and genetic risks due to the release into the environment by any means (accident, sabotage, nuclear warfare, or routine operational releases) of the more hazardous radioactive isotopes of very long half lives,

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17/ If, as noted above, see footnote 7, supra, little or no reprocessing capacity will exist in the United States for a number of years and if European capacity is also limited, the impact of this turn of events must also be fully assessed, i.e., will it result in substantial storage of "spent" fuel elements at reactor sites over a long period of time and how might this increase diversion risks.

e.g., plutonium 239, iodine 129, krypton 85, cesium 137. This should include discussions of the significant isotopes, possible modes of release, quantities involved, transport mechanisms, resuspension factors, and the uncertainties with respect to each of these. The discussion should be related to the radiological and biological properties of such radionuclides. Special attention should be given to the global impact of long-lived, environmentally mobile radionuclides. The Commission should identify the levels which it deems acceptable for the accumulated buildup of such radioactivity in the biosphere and identify possible mechanisms by which such levels could be exceeded, together with an assessment of the likelihood of such an eventuality.

(5) The Waste Heat Discharge Problem -- In addition to the radiological problems associated with nuclear power development, the Commission must deal with non-radiological impacts, especially waste heat discharges. The Commission, as well as discussing the immediate effects of waste heat discharges or plant shutdowns on bodies of water adjacent to particular power plants, should deal with the problem of increased waste heat in the environment, on a global basis, resulting from the long term growth of the fission power generating industry. As suggested by Alvin Weinberg, in his paper, "How Can Man Live With Fission?"15/,

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15/ Unpublished paper, circulated for discussion at a Conference at the Woodrow Wilson International Center for Scholars, Washington, D.C., June 18, 1973.

some attempt should be made to identify the ultimate climatic limits on the production of electrical energy, the influence of manmade heat both locally and regionally, and areas of needed research into basic climatic mechanisms and the influence of climatic change on man's activities.[19]

(6) Disruption of Aquatic Ecosystems -- Both thermal pollution and the processes of "entrainment" and "impingement" (in once through cooling systems) can have major impacts on affected aquatic ecosystems.[20] Because the Programmatic Statement is covering an international program, it provides a unique opportunity for the Commission to examine extended geographic effects which may be associated with the disruption of particular aquatic ecosystems.

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[19] See, e.g., Alvin Weinberg, "The Moral Imperatives of Nuclear Energy", Nuclear News, December 1971, at 33; Amory Lovins, World Energy Strategies: Facts, Issues, and Options (1973).

[20] Thermal pollution -- the increase of water temperature due to waste heat discharges from power plants -- can affect such functions as migration, spawning, feeding efficiency, swimming speed, embryological development, and basic metabolic rates of aquatic life. "Entrainment" -- the drawing of small aquatic life, including fishes, plankton, and larval stages of shellfish into power plants along with the cooling water withdrawn from public waters for open cycle, or once through cooling of steam condensers -- and "impingement" -- the impaling of such life on intake screens -- can result in death rates of sensitive forms of aquatic biota approaching 100%. See John Clark and Willard Brownell, Electric Power Plants in the Coastal Zone: Environmental Issues (1973).

For example, power plant operation may obstruct the reproductive cycle of anadromous fish species by (1) killing the young by entrainment, impingement, or polluted discharge; (2) killing their food organisms or disrupting the food chain; (3) disrupting and degrading the ecosystem in which the young live and thus weakening their life support system; and (4) blocking the migratory travel ways of incoming spawners and outgoing young fish with thermal plumes and chemical discharges. The net result of the obstruction of the reproductive cycle of anadromous species can be a reduced production in spawning rivers and estuaries and a consequent depletion of fisheries hundreds or even thousands of miles distant. Similar effects can be observed with respect to catadromous and regional migratory species. To the extent possible, the Commission should therefore study fish migration patterns in major ocean fisheries, relate such patterns to power plant operations in the coastal zones or in estuaries and rivers in which such fish breed or through which such fish pass in their juvenile stages, and attempt to develop conceptual models which may be used to prevent or minimize adverse environmental impacts resulting from power plant siting in coastal zones.

(7) Indirect Impacts -- Indirect, secondary environmental consequences of the Program must be analyzed. In particular, the impact of increased public utility

demand for fuels and the release of harmful effluents into the air and water as a result of the generation of electrical energy necessary to run enrichment facilities must be assessed. This assessment, as far as the United States is concerned, should be carried out in light of the possible demand for and creation of new enrichment facilities[21], the current and long-term "energy crisis" and the call for energy conservation in this country. In other words, the Commission must ask the question: Does it make sense for the United States to utilize great amounts of domestic energy to produce nuclear fuel for export, rather than encouraging the export of non-nuclear energy supply systems?

(8) Long Term Social Implications -- The Commission must treat the socio-political implications of the growth of a worldwide fission power industry. As noted above, the ethical implications of the "Faustian bargain" are perhaps the most fundamental which society must face in choosing to develop fission power as a source of electrical energy. Dr. Weinberg, in his article in *Science* stresses the need, "... of creating a continuing tradition of meticulous attention to detail." He further states:

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[21] The current overextension of enrichment capacity and lack of reprocessing facilities, as they might affect future demand, should be factored into this analysis. See note 7, *supra*. If plutonium recycling does not take place, presumably at least two results are possible: (1) increased pressure to create new enrichment facilities; (2) decreased pressure for such facilities as demand shifts to reactors other than light water reactors or to non-nuclear energy sources.

> "In a sense we have established a military priesthood which guards against inadvertent use of nuclear weapons, which maintains what a priori seems to be a precarious balance between readiness to go to war and vigilance against human errors that would precipitate war. Moreover, this is not something that will go away, at least not soon. The discovery of the bomb has imposed an additional demand on our social institutions. It has called forth this military priesthood upon which, in a way, we all depend for our survival.
>
> "It seems to me ... that peaceful nuclear energy probably will make demands of the same sort on our society, and possibly of even longer duration." 22/

The Programmatic Statement must discuss these demands and must indicate the extent to which the fundamental principles of the international system must be changed to meet them. Certainly the Programmatic Statement must treat in detail the full socio-political implications of an effective safeguards program, as well as the secondary impacts of the safeguards program, including (1) the threat to personal liberty and individual privacy that would occur (i) as a result of the development and implementation of such a program, in general, and (ii) as a result of responses to nuclear theft or sabotage and attempts to recover illicitly obtained materials, in particular, and (2) the threat to domestic and international political order and governmental processes that would result from successful diversion of fissionable material. Increased risks of destruction of fission power facilities,

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22/ Alvin Weinberg, "Social Institutions and Nuclear Energy", Science, July 7, 1972, at 27, 33-34.

with consequent dispersal of radioactivity into the biosphere, by means of conventional warfare, sabotage, or terrorism must be fully discussed, and the psychological and political implications of the creation of these risks assessed. Similarly, the kind of social stability needed to achieve long term containment of high level radioactive wastes should be dealt with. Ultimately, the question must simply be asked whether the risk of the spread and potential use of nuclear weapons and the burden of continuous monitoring and sophisticated management of a dangerous material "continuously and *indefinitely*"23/ can be borne, given the current state of national and international institutions.

III. Alternatives to the Proposed Action (Section 102(2)(C)(iii) of NEPA)

The discussion of alternatives must treat any reasonable alternatives to and within the Program and examine the environmental impact of each such alternative. The discussion of alternatives, moreover, should identify and treat separately alternatives available to all federal agencies involved in the Program, including the Commission, Eximbank, and the Department of State, alternatives available to foreign countries, including regional intergovernmental organizations, such as Euratom, and alternatives available to international organizations, such as the IAEA.

23/ Allen Kneese, "The Faustian Bargain", *Resources*, No. 44, September 1973 (emphasis in original).

Because a primary objective of the Program is, presumably, to help spread the use of nuclear fission as a means of generating present and future needs for electrical energy, a central focus of the alternatives section should be on the various ways in which these energy needs can be met in order to provide a basis for comparing the risks and benefits of alternative strategies for meeting world energy needs (and the energy needs of particular countries and regions) with the risks and benefits of providing for such needs through the Program as presently constituted. This task demands a careful and comprehensive presentation of options, or packages of options to the decisionmakers. At least three sets of options (all of which are interrelated) can be clearly identified: (a) energy policy options, (b) regulatory options, and (c) promotional options.

(a) Energy Policy Options

The fundamental set of options which the Commission must evaluate relate to energy policy and planning. The Commission must examine world energy needs, on a country by country and regional basis, and the various energy policy alternatives for meeting these needs, both in light of specific national concerns and general international considerations, and then proceed to assess the relative risks and benefits of the different approaches. In essence, the Commission must look at resource development and energy utilization strategies, seeking to determine what strategies are in the best long term interests of the nations involved and the world community.

We would emphasize that it is necessary in this regard for the Commission to take a hard look at the economic viability of fission power over the next fifty years in both developed and developing countries interested in obtaining U.S. assistance and to come up with appropriate models for evaluating the needs of such countries. In any specific instance, should the Program be continued, the Commission could then weigh energy needs, within the framework of explicit and varying assumptions regarding projected electrical energy consumption, against alternative energy production possibilities, looking at the economic, social, political, and environmental costs of all these alternatives. The point is that a discriminating approach must be taken to the transfer of technology, based upon realistic assessments of conditions (including energy needs, energy resources, and technical capacities) in a wide range of countries.

In terms of energy policy, the Commission must consider (1) developing policies and programs to assist the export of non-nuclear energy supply systems and technology, and/or (2) developing policies and programs to assist the export of systems and technology for encouraging efficient and discouraging wasteful energy usage. Clearly, the fundamental alternative here is the prospect of adopting a program aimed at creating a worldwide fission free electrical energy economy and terminating the Program as it now exists. This would involve a decision to decline to authorize, finance, assist, license, or otherwise facilitate the export of fission power generating systems and nuclear fuels.[24] Elements of an alternative program might include:

(1) an expanded program to develop in this country and to export more environmentally responsible, efficient technologies for converting fossil fuels to electricity, including the development of coal stack gas cleanup, and coal gasification and liquification;[25]

(2) a greatly expanded program to develop and export solar energy for heating, cooling, and electricity; [26]

24/ This "no action" alternative, of course, must be considered under NEPA, see Council on Environmental Quality, *NEPA Guidelines*, 40 C.F.R. § 1500.8(a)(4), and, might simply involve termination of the Program without creation of an alternative program to support the export of other energy technologies. In a sense, then, termination can be perceived as a purely regulatory option, i.e., a way to shut off fission power development. In connection with this alternative, it is also essential for the Commission to analyze the extent to which current and prospective foreign competitors in the nuclear market utilize United States licensed or United States supplied technology, and, if they do, the ways in which the United States could exercise effective control over the further diffusion of such technology, *i.e.*, by prohibiting foreign subsidiaries or licensees of United States manufacturers from transferring technology and fuel to other nations.

25/ See, *e.g.*, Hammond, A.L., *et al.*, *Energy and the Future* (1973).

26/ See, *e.g.*, Tamplin, A.R., *Our Solar Energy Options: Physical and Biological*, Lawrence livermore Laboratory Livermore, Calif., UCRL-51315, January 2, 1973; NSF/NASA Solar Energy Panel, *An Assessment of Solar Energy as A National Energy Resource*, National Science Foundation, Washington, D.C., December 1972.

(3) an expanded effort to develop and export the technology for exploiting geothermal resources; 27/

(4) a major program aimed at developing and exporting the capability to generate electricity through wind and tidal power; 28/

(5) an increased effort to develop a commercial, exportable fusion reactor; 29/ and

(6) a major program aimed at providing information to foreign countries with respect to the possibilities of conservation and a limited growth in demand for electricity. 30/ With respect to the discussion of each of these fission-free energy policy options, a substantial effort must be made to set out all the costs (economic, social, and environmental) of developing and exporting such alternatives, together with projections of the time involved to allow

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27/ See, *e.g.*, Rex, Robert W., "Geothermal Energy -- The Neglected Energy Option", *The Energy Crisis*, *Science and Public Affairs*, *The Bulletin of the Atomic Scientists*, July 1972, at 121-125; Anderson, J. Hilbert, "Geothermal Heat and a Vapor Turbine Geothermal Power Plant", 117 *Cong. Rec.*. S. 21476 (December 11, 1971).

28/ See, *e.g.*, Anderson, J.H., "The Sea Plant - A Source of Power, Water, and Food Without Pollution", 117 *Cong. Rec.* S. 16888-S.16890 (October 27, 1971).

29/ See, *e.g.*, R.F. Post, "Fusion Power, the Uncertain Certainty", in *The Energy Crisis*, *Science and Public Affairs*, *The Bulletin of Atomic Scientists*, July 1972, at 114-120.

30/ See, *e.g.*, Executive Office of the President, Office of Emergency Preparedness, *The Potential for Energy Conservation - A Staff Study* (October 1972).

such alternatives to replace, singly or in combination, fission energy.

Finally, in addition to a set of totally fission free options, the Commission must consider various combinations of fission and non-fission alternatives and the impact of each such combination. For example, United States programs and policies might place greater emphasis on the development and export of fission free technologies than is currently placed, yet continue to promote and/or license, to a lesser degree, current light water reactors, or they might focus on energy sources other than fission, and promote the use of reactors other than current model light water reactors, such as high temperature gas cooled reactors. Each of these alternatives, moreover, should be discussed in light of the impact of development of a plutonium recycling economy and the various electrical energy growth assumptions outlined above.

(1) Regulatory Options

A central focus of the Programmatic Statement must be on developing alternative regulations, policies, and practices, should the Program be continued, for preventing potential adverse environmental impacts, wherever they occur, associated with the Program as a whole and individual actions implementing it. A number of institutional and substantive policy changes are possible. At a minimum, alternatives considered should include(1) establishing and requiring compliance with comprehensive international or regional standards governing the nuclear power fuel cycle; (2) requiring compliance by foreign countries with standards applied to the nuclear power fuel cycle in the United States; and (3) establishing United States and/or additional international guidelines to assist foreign countries in regulating the nuclear power fuel cycle. From an institutional standpoint, alternative frameworks evaluated might include, *inter alia*, restructuring the IAEA to provide for a more effective safeguards system 31/; creating an international nuclear protection and transportation service 32/; establishing a new international agency with overall standard setting authority for each segment of the nuclear power fuel cycle; revising the rules and regulations of the Commission (or other responsible federal agencies) in order to ensure greater access to information

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31/ Proposals made by Taylor, Willrich, and others in recent major studies of safeguards issues should be discussed in this context. See Mason Willrich and Theodore Taylor, *Nuclear Theft: Risks and Safeguards* (1974); Mason Willrich, ed., *International Safeguards and Nuclear Industry* (1973); see also testimony of Theodore Taylor on June 25, 1974 before the Subcommittees on International Organizations and on the Near East and South Asia of the House Committee on Foreign Affairs.

32/ *Cf.*, Rosenbaum, *et al.*, *Special Safeguards Study*, AEC News Release No. P-201 (April 29, 1974), calling for such a service in the United States. The same study makes a number of other recommendations for an improved safeguards program, and their implementation internationally should be considered by the Commission.

with respect to foreign reactor problems; or strengthening Congressional authority over transfers of fission technology 33/. With regard to specific substantive proposals, aimed at reducing environmental, health, safety, and safeguards risks, the Commission might consider, *inter alia*, requiring all countries desiring to obtain fission technology and fuels from the United States to become parties to the Treaty on the Non-Proliferation of Nuclear Weapons 34/, or to agree not to reprocess spent nuclear fuel or utilize recycled plutonium in their countries, or to agree to physical security arrangements subject to United States or international inspection and control. 35/ Similarly, specific requirements with respect to the safety of reactor operation, such as meeting

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33/ See, *e.g.*, the debates this summer on S. 3698 and H.R. 15[illegible]82, 120 *Cong. Rec.* S. 11416-S.11519 (June 25, 1974); 120 *Cong. Rec.* S. 12112-12128 (July 10, 1974); 120 *Cong. Rec.* H.7432-H.7450 (July 31, 1974); a bill has also been introduced into the Senate by the Senate Committee on Banking, Housing, and Urban Affairs to provide for Congressional review of all ExImBank loans in excess of $50 million.

34/ See Testimony of Herbert Scoville on June 25, 1974, before the Subcommittees on International Organizations and Movements and on the Near East and South Asia of the House Committee on Foreign Affairs.

35/ Mason Willrich and Theodore Taylor, *Nuclear Theft: Risks and Safeguards*, 159-162, 167-173 (1974). When physical security requirements or other concrete regulatory alternatives are discussed, precise proposals should be made so that the decision maker has before him viable options upon which he can take immediate action.

certain emergency core cooling system or population density criteria, and with respect to other segments of the fuel cycle, i.e., effluent criteria for reprocessing facilities, should be explicitly examined. Finally, the alternative of not exporting fission reactors and nuclear fuels to particular countries or regions, either because of political instability or lack of adequate regulatory standards and competence, or perhaps merely because such countries do not now have nuclear weapons, must be considered, and possible guidelines for implementing such a decision delineated.

To the extent that varying combinations of international and national regulation can be conceived for various stages of the fuel cycle, these, too should be explained. For example, one conceivable alternative might be for the United States to require reprocessing of spent exported fuel and storage of radioactive wastes separated therefrom within the United States, with reprocessing and waste storage subject to the United States' own standards. However, international regulations might apply to the transport of spent fuel from the reactor to the United States.36/ Similarly, an international body

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36/ In general, such transportation, reprocessing, and waste storage options are a matter of major concern to Congress and the public. As Senator Hartke stated during the debate on S. 3698 on July 10, 1974:

> "[T]here are major unresolved questions with regard to transportation hazards involved in the sale or

[footnote continued on next page]

might be responsible for the storage and disposal of high level nuclear waste, but the other aspects of the fuel cycle might be left open to national regulation. Thus, a series of models of national and international regulation can and should be developed in order to give the

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grant of nuclear power plants to foreign countries. Some of these include the following:

a. Will irradiated fuel be reprocessed in the country having the nuclear power plant or in the United States? If the latter, because of national security reasons, who shall establish safety requirements for transportation and who shall insure that such requirements are met?

b. Will radioactive wastes be stored in the United States or abroad and if the latter under whose control?

c. What are the respective roles of the AEC, Department of State, and Department of Transportation in opposing the safety of the movement of radioactive material to and from foreign countries?

d. Can these agencies provide unequivocal assurances to the Congress and to the public that the movement of toxic radioactive material to and from foreign countries can be undertaken with absolute assurance that no leakage will occur?

Until these issues are thoroughly reviewed by the Congress, I would urge the administration to hold off on signing any international agreements for the sale or grant of nuclear power plants." 120 Cong. Rec. S. 12127-S. 12128 (July 10, 1974)

In light of current and projected reprocessing and waste storage demands and capabilities worldwide, the relative merits of reprocessing and waste storage in the United States, as opposed to reprocessing and waste storage in Western Europe or elsewhere, should thus be given particular attention, in the Programmatic Statement, focusing not only on technical capabilities, but upon the risks of diversion and accident, especially those associated with transportation of nuclear materials.

decisionmaker a sense of the wide range of options available to provide for adequate regulation of the nuclear power fuel cycle on an international scale.

In the context of regulatory options, the possibility of only assisting or authorizing the export of certain reactor technologies should also be considered. For example, perhaps only reactors other than current production model light water reactors, which may not need to utilize enriched uranium as fuel and/or which may otherwise minimize adverse environmental effects, should be exported. Perhaps within the range of current light water reactor models only some design models, with demonstrably greater safety characteristics, should be exported. Or perhaps current production model light water reactors should continue to be exported, but a decision should be made, because of greater plutonium diversion risks, not to authorize the export of liquid metal fast breeder reactors when commercially available.

Lastly, in connection with all regulatory alternatives, the Commission must consider whether to postpone the Program until desirable regulatory mechanisms can be put in place, that is, until environmentally and politically sound international standards governing the construction and operation of exported fission power plants and the use, transportation, and management of exported nuclear fuels and associated radioactive wastes are developed, or until environmentally safer technology is available, *i.e.*, fully tested emergency core cooling systems or a viable solution for long term management of high level radioactive wastes.

(b) *Promotional Options*

Because the United States is among the world's leading suppliers of fission power generating systems and because it has supplied or will in the foreseeable future supply the vast majority of enriched nuclear fuel for use in current model light water reactors now in operation, under construction, or planned 37/, United States promotional policies -- including most importantly the mere availability of export authorizations -- have a substantial impact on the growth of fission power generating capacity worldwide. Short of terminating the Program (also, in some sense, a promotional alternative), see page 36, *supra*, there are a number of promotional alternatives which can be considered. For example, it might be decided that, because of the substantial secondary impacts of enrichment facilities in the United States and our own needs to conserve energy and produce nuclear fuel for domestic uses, the United States should

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37/ See the Commission's Answers to Interrogatories, dated February 15, 1974, in *Sierra Club et al v. United States Atomic Energy Commission, et al.*, (D.D.C., Civil Action No. 1867-73).

decline to provide enrichment services, even though it could continue to export reactors.[38] Needless to say, this is a complex option, which has a number of risks and benefits which must be carefully weighed. If the United States declined to provide enrichment services, what sources of enriched nuclear fuels would be available? How might a decision not to export enriched nuclear fuels interrelate with a decision to promote reactors other than current model light water reactors, such as heavy water reactors utilizing natural uranium? [39] And what are the environmental risks and benefits of all these alternatives? [40]

Additionally, it is especially important to evaluate promotional alternatives from the standpoint of the central United States financing institution, Eximbank. For example, how would a decision by Eximbank not to provide financing for the export of fission power generating systems and nuclear fuels, coupled with a continued willingness of the Commission to consider and issue export licenses, affect the world's fission power market? Likewise, if Eximbank continued to finance the export of fission power generating systems and nuclear fuels, but declined to make any commitment to provide financing for life the plant fuel replacements, what impact would that have on prospective purchasers and, ultimately, on fission power development worldwide? 41/

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[38] It seems problematical whether, because of cost constraints, national security considerations, and proliferation risks, export of enrichment technology is a viable option.

[39] See Note 7, *supra*.

[40] Requiring or prohibiting reprocessing of spent exported fuel within the United States might also be considered under the rubric of promotional alternatives. For example, would a guarantee of reprocessing in the United States encourage foreign countries to obtain United States fission power generating systems and enriched nuclear fuels? Would a decision to prohibit reprocessing such spent fuels in the United States discourage the development of fission power? And what would the impact of these alternatives be?

41/ From a regulatory standpoint, alternatives are also available to Eximbank. For example, it is conceivable that foreign purchasers of United States fission power generating systems and nuclear fuel might be required to meet certain environmental, health, or safety standards as a precondition to obtaining financing.

IV. Analysis of Cost and Benefits

The Guidelines of the Council on Environmental Quality call for inclusion in impact statements of "an indication of what other interests and considerations of federal policy are thought to offset the adverse environmental effects of the proposed action ....." 42/ They further require that "agencies that prepare cost benefit analyses of proposed actions should attach such analyses, or summaries thereof, to the environmental impact statement, and should clearly indicate the extent to which environmental costs have not been reflected in such analyses." 43/ The Commission, therefore, should prepare, preferably in the form of separate appendices to accompany the Programmatic Statement, a discussion of other essential, non-environmental considerations of national policy relevant to the decision of the Commission and other responsible agencies under NEPA regarding the future of the Program. In accordance with the Guidelines of the Council on Environmental Quality, "the statement should also indicate the extent to which these stated countervailing benefits could be realized by following reasonable alternatives to the proposed action ... that would avoid some or all of the adverse environmental effects." 44/

42/ Council on Environmental Quality, NEPA Guidelines, 40 C.F.R. §1500.8(a)(8).

43/ Id.

44/ Id. The Commission's Guidelines contain a similar provision. 10 C.F.R. §11.55(9).

In particular, the Commission must evaluate whether foreign policy, balance of payments, or other non-environmental considerations can be met by encouraging and promoting programs to develop fission free energy economies.

With regard to the preparation of a specific cost-benefit analysis on the proposed action, we would question, in the first instance, whether a cost-benefit analysis can answer "the most important policy questions associated with the desirability of developing a large scale, fission-based economy." 45/ As NRDC stated in its comments on the LMFBR program, "Cost-benefit analysis alone simply cannot decide for us whether it is just or fair for the present to impose upon the future the risks of catastrophic accident and the burdens of essentially perpetual care for highly poisonous materials." 46/ The difficulties, moreover, of preparing such an analysis even for a long-term program in this country, such as the LMFBR program, are exceedingly great, and these difficulties are magnified enormously if one attempts the quanitification of risks and benefits of a worldwide program involving many countries with radically different social systems, each country weighing the costs and benefits of nuclear industry to its citizens in sharply contrasting manners. Moreover, merely to look at costs and benefits to the United States alone would be misleading in

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45/ Allen Kneese, "The Faustian Bargain," Resources, No. 44, September 1973.

46/ NRDC Comments on WASH 1535, Socio-Political Impacts, at 15.

making a judgment with respect to the overall advantages or disadvantages of proceeding with or modifying the Program. Under such circumstances, the Commission must recognize that a strict quantitative cost-benefit analysis may be only of limited usefulness.

To the extent that such an analysis is undertaken, however--and it is required to be undertaken "to the fullest extent practicable" by the Commission's NEPA Guidelines, 10 C.F.R. §11.55(9)--we would make two comments. First, the factual underpinnings for any quantitative comparisons of the costs and benefits of the Program with the costs and benefits of the options discussed at pages 34 to 46, supra, must clearly be set forth. Second, every effort, in accordance with the Commission's Guidelines, must be made to deal in qualitative terms with unquantifiable factors, giving full play to the socio-political impacts and the impacts of accidents and unscheduled events noted above which may well be far more important in assessing the future of the Program than the economic and technical feasibility of fission power development worldwide. Only in this way can a truly informed, independent judgment be made with respect to the future of the Program.

V. Conclusion

The suggestions made in this letter are not meant to be comprehensive or inclusive in terms of what the Programmatic

Statement must contain. 47/ However, they are intended to set out, in as great detail as is possible at this time, a number of critical points which the environmental groups believe must be dealt with thoroughly and forthrightly in the Programmatic Statement if it is to serve as an adequate vehicle for the decisionmakers. The Program has in the past been carried out without the little effort having been made to consider the domestic and international environmental impacts of our export policies or to assure that exported equipment and fuels were used in such a way as to minimize environmental, health, safety, and diversion risks. The focus of the Programmatic Statement must be to redress this balance and fully analyze the risks and impacts of this Program and alternatives to it so that it can be intelligently debated in both national and international forums.

This analysis must lead, consistent with the Commission's NEPA Guidelines (10 C.F.R. §11.55(9)), to a set of proposed findings, recommendations, and policy determinations regarding the future of the Program. At a minimum, such findings, recommendations, and policy determinations should include:

47/ The Commission must, of course, consider such topics as the adverse effects of the Program which cannot be avoided should it continue to be implemented (Section 102(2)(C)(ii) of NEPA), the relationship between local short-term uses of the environment and the maintenance and enhancement of long-term productivity (Section 102(2)(C)(iv) of NEPA) and any irreversible and irretrievable commitments of resources involved in implementation of the Program (Section 102(2)(C)(v) of NEPA).

(a) to the extent that the Program would be continued, recommended criteria and standards (as well as procedures for developing them) and data-gathering requirements and mechanisms designed to prevent potential adverse environmental impacts, wherever they occur, associated with the Program as a whole and individual actions implementing it; and

(b) recommended initiatives and programs (including procedures for their development) designed to maximize international efforts of cooperation for developing energy policies which will serve to anticipate and prevent potential adverse environmental impacts associated with providing for growing worldwide energy demands.

In closing, we would like to suggest to the Commission that at least two further procedural steps be followed during the preparation of the Programmatic Statement in order that the fullest possible public consideration thereof can be obtained. First, we would suggest that as soon as a comprehensive outline of the Programmatic Statement is prepared, this outline itself be circulated for public comment so that appropriate changes can be made, responsive to public input, prior to release of the draft Statement. Second, we urge the Commission to make every possible effort to circulate the draft Statement not just to federal, state, and local agencies in this country, but also to international organizations, such as the IAEA, and to affected foreign countries. In this connection, we would also urge that the Commission endeavor to have appropriate agencies in foreign countries inform the citizens of such countries of the availability of such Statement and encourage their comment, wherever possible.

We appreciate this opportunity to submit our views to the Commission. If the staff of the Commission has any questions with respect to the comments contained herein or would like any further elaboration of such comments, we would be most happy to meet with it any time and provide what additional assistance we can.

Very truly yours,

Eldon V.C. Greenberg

Richard A. Frank
Counsel for the Sierra Club,
Environmental Defense Fund,
National Parks and Conservation
Association, Natural Resources
Defense Council, and Friends of
the Earth

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GOVERNMENT OPERATIONS COMM.
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9 May 1975

Senator Abraham Ribicoff
Senate Committee on Government
Operations
Washington, D.C. 20510

The Export Reorganization Act of 1975, S.1439

Dear Senator Ribicoff:

I am writing in response to your letter of May 5, 1975. In that letter, you ask what provision is made in export licenses for matters such as plutonium reprocessing and waste disposal and whether any advance consideration is given to these problems before an export license is approved. Current published regulations are silent on these specific issues, and my underdstanding of the extent to which they are dealt with under current procedures is necessarily limited by lack of first hand knowledge. However, based primarily upon the description of the export process provided by the Energy Research and Development Administration in its "Proposed Findings Supporting Determination Related to International Nuclear Power Export Activities Pending Preparation of a Section 102(2)(C) NEPA Environmental Statement", issued April 7, 1975 (the "Proposed Findings"), the following facts can be set out:

(1) Agreements for cooperation, which are now negotiated without the participation of the Nuclear Regulatory Commission, may, in some instances, contain provisions relating to the reprocessing of spent fuel elements and the management and disposal of radioactive wastes. For example, by virtue of a 1974 amendment to our bilateral agreement for cooperation with Austria, the United States must agree to the acceptability of facilities selected for reprocessing radiated fuel elements containing fuel material received from the United States, after having determined that relevant safeguards provisions may be effectively applied. Proposed Findings, p. 22. That same agreement provides that the United States may require storage of special nuclear material in U.S.-designated facilities. Proposed Findings, pp. 24-25. These provisions are related to safeguards only, and not health, safety or environmental

protection. It is not clear from the Proposed Findings, moreover, whether even provisions such as those in the amended Austrian agreement are embodied in all our other bilateral agreements. Finally, the Proposed Findings do not indicate when and how the Energy Research and Development Administration may exercise its authority under such agreements; what standards it would apply in passing on the acceptability of reprocessing and waste storage facilities; or to what extent (if any) other public officials and the public would participate in the agency's decisionmaking process.

(2) At the licensing stage of the export process -- a stage which presumably occurs a number of years after execution of an agreement for cooperation -- it is not clear whether there is a formal review, as such, even from a safeguards standpoint, of reprocessing and waste storage plans. However, the Nuclear Regulatory Commission must determine whether issuance of the license would be within the scope of and consistent with an agreement for cooperation. Proposed Findings, p. 35. Conveivably this may involve an examination of whether reprocessing and waste storage operations will be carried out in accordance with understandings previously reached in implementation of the provisions of an agreement for cooperation. In any event, under current licensing practices, the Nuclear Regulatory Commission makes no independent judgment in this regard, but merely relies upon the advice of the Division of International Security Affairs of the Energy Research and Development Administration which reviews license applications. It is not indicated in the Proposed Findings on what basis the Energy Research and Development Administration makes its judgments with respect to consistency of export licenses with agreements for cooperation.

As the above discussion indicates, the nature and extent of control exercised by the Energy Research and Development Administration and the Nuclear Regulatory Commission over plutonium reprocessing and waste disposal in the export process are relatively obscure. A substantial effort by your Committee and others promptly to clarify these issues and to seek a rational, overall regulatory scheme is highly desirable.

I hope the information presented above answers your questions. If you have any further questions, please do not hesitate to contact me, and I shall be most happy to respond as best I can.

Sincerely,

Eldon V. C. Greenberg

Senator GLENN. Our next witness will be Mr. Carl Walske, who is the president of the Atomic Industrial Forum.

TESTIMONY OF CARL WALSKE, PRESIDENT OF THE ATOMIC INDUSTRIAL FORUM, INC.

Senator GLENN. Mr. Walske, we are glad to have you with us this morning. We have a short statement from you. Would you prefer to enter that in the record or would you like to read the statement? What is your preference?

Mr. WALSKE. Well, I can condense it a little bit. It is already mercifully short, but for that reason a summary is almost equivalent to the full statement. It can be inserted.

Senator GLENN. Fine. It will be inserted in its entirety at the conclusion of your testimony.

Mr. WALSKE. I would like to emphasize, as I say in the statement, that I am appearing here presenting my own views, although I do believe that most of the 625 member organizations of our association would generally agree with my views.

The bill you are considering is certainly a bill that has as its objectives ones that most people would fully support; and I would also. There is a question of how—once the objectives are set forth—how best they might be achieved. Here, perhaps, reasonable people would differ.

Going back a little bit, historically, some years ago the United States was in quite a dominant position with regard to nuclear technology and the supply of nuclear services, such as the enriching of uranium. If it had so chosen, perhaps it could have dictated the substance of international arrangements for the commerce in nuclear technology. As a matter of fact, we did not dictate. Instead, we chose to influence others by persuasion and leadership. In general, we achieved what we set out to achieve.

For example, the treaty on nonproliferation came into being. The safeguards system of IAEA exists today. The export of highly enriched uranium, to the extent it was exported, took place under the controls for which we asked.

While the danger of additional nations becoming nuclear weapon powers was recognized years ago, the possible threat from terrorists or criminals has only recently been recognized. This is a different matter. It is not a question of national intentions with all their military, economic and foreign policy ramifications. Safeguards against criminal elements are different and depend in essence on the same type of physical protection given to any very valuable material.

With the recent recognition of the threat of diversion by criminal elements, the United States has increased the priority on avoiding it. We have all been impressed as acts of terrorism and violence increased throughout the world. In every country political leaders are anxious to provide adequate safeguards against the seizure of nuclear materials by criminal elements.

I think that is an important point. This being a really rather recently recognized threat, I don't believe that we should assume that the fact that we did not ourselves deal with it 10 years ago and others did not deal with it 10 years ago means that they are not interested in dealing with it. I sincerely believe that sensible people all over the world would want to control plutonium in such a way that it represents no undue threat to people.

In the present situation it seems to me that the most effective approach to improving safeguards against criminal elements must be based on cooperative international efforts, both bilaterally and multilaterally through IAEA or some other organizational arrangement. In my opinion, we cannot dictate at this point, even if we want to, because we are only one of many possible suppliers for nuclear materials and technology.

On the other hand with regard to nuclear proliferation we must, I believe, in our new agreements for cooperation take such steps as we can to inhibit proliferation. I have in mind, in particular, the need to urge upon new entrants into the nuclear power field that they enter into regional type arrangements for reprocessing nuclear fuel. It is, of course, only at this stage that weapons grade material becomes available from the operation of most current reactor types.

I should interject here also the same thing might well be applied to uranium enriching facilities which have the capability for bringing uranium to a weapons grade.

If we avoid the proliferation of nationally operated reprocessing plants, and also enriching plants which have the capability for turning out weapons grade material, we will certainly alleviate to an extent the problem of new nations becoming nuclear weapon powers.

Incidentally, because of the economics of reprocessing nuclear fuel it makes good sense commercially to pool reprocessing capacity.

Applying my philosophy to S. 1439 I suggest that it would be more effective if it were modified to:

One: Make the State Department, as the foreign policy agent of the President, the ultimate judge of whether nuclear exports are advisable, based on advice from NRC, ERDA, DOD, and our intelligence services.

Two: Recognize that adequate safeguards are a function not only of the level of physical protection, but also of the threat existing in any country, and, therefore, they may vary from case to case in order to be suitable.

Third: Call upon the executive branch to proceed more on a cooperative path with other countries than on the basis of a U.S. veto.

With that, I would be pleased to answer any questions you may have.

Senator GLENN. We do appreciate this very much. You do represent a very broad base group here. Part of your statement you skipped over such as the first page. Just for the record, it indicates you have some 625 members in your organization and 20 percent of your membership is from abroad. It covers the whole spectrum of nuclear atomic energy, I believe. So you do represent quite a group and have a broad basis from which to draw your information.

I would like to review this just a little bit of your last recommendation there to call upon the executive branch to proceed more on a cooperative path with other countries than on the basis of a U.S. veto.

This would indicate that you are in favor—I can presume, and correct me if I am wrong—you would favor giving authority over controls, safeguards, and so on to some international organization of an IAEA type. If that is true, would it move out of the accountancy program which it is basically engaged in now into a real authoritarian control type organization?

Mr. WALSKE. Well, if I can expand a little bit?

I think it is absolutely vital that we take this word "safeguard" and divide it into two separate problems or areas—and I will answer your question. The one area, the old area if you like, that we all have been working on and have recognized for a long time, is the area of proliferation, that is, the area of Government action by an independent Government. That is one type of thing.

Another type of thing is safeguards against criminal elements or substantial elements, as Ted Taylor likes to call them, or even elements foreign to a country. Basically this type of thing requires not exactly the police type of protection, but something very much like police type protection in order to deal with it.

In the one case you are dealing with the intentions of a sovereign government, that is, in the first case you are dealing with the intentions of a sovereign government. The way that you deal with that might be very different than the case where you are concerned with how well another government runs its police force or its police forces —sercurity forces or whatever you want to call them.

I think the governments may get very delicate when it comes to their sovereign rights regarding whether they are going to become a nuclear power or not. And the way that we dealt with that over the years was a very, very, sensitive thing. We pushed it as hard as we could and we achieved a Nonproliferation Treaty. And it seems to have been just about the upper limit of what we could get. Maybe we would have liked more, but I think we got just everything that the traffic would bear.

But in the other area of safeguards against criminal elements or subnational groups, I do not believe it is correct to assume that any government would want to leave that problem unsolved.

I have just come back from a recent—just last week—two weeks in Europe. The subject of safeguards for plutonium is a very keen subject over there among government leaders and among the industry. I see no indication whatsoever that these people think that it is trivial and that it should not be treated in a serious manner. Well, to take a sovereign government in Europe—and an industrialized power—and to sit down with them and dictate to them exactly what their security arrangements are going to be—I suppose it is possible, but it seems to me much more practical and totally achievable to sit down with them and talk it over and come to a common conclusion.

I spent, and the record does not show it, but I spent—before these last 2 years in the position I am in—seven years in the Department of Defense as the Assistant to the Secretary of Defense for Atomic Energy. In that position I think I had the senior civilian responsibility in the Government in a full-time sense for the security of nuclear weapons. In that position and from that perspective I think I have a fair appreciation for the security attitudes of the industrialized countries, certainly the ones that have been involved in atomic energy. I find no inclination whatsoever on their part to be cavalier with security matters.

Senator GLENN. If I am reading properly from what you are saying, and correct me if I am wrong, you are saying part and parcel of delegating authority, the international organization would go ahead and sell controls to the individual nations and let them pretty much decide on their own how they want to use them and exercise their own good judgment. Is that correct?

Mr. WALSKE. Well, I think that the international agency—the International Atomic Energy Agency is, in fact, only serving a monitoring function. As a monitoring function, and this is over the actions of governments really, the most that it does, in reality, is to sound an alarm bell if something is being done improperly—if a Government is not accounting for the special nuclear materials that are within its control. That is a very useful function especially if the government has taken a pledge they are not to become a nuclear power.

With regard to the safeguards against criminal elements, I think probably there is a big handicap in working through an international agency, the handicap being that in security systems—at least in the final details of security systems—it is a good idea not to make public every single thing that you have in mind in order to have protection. I think that bilateral governmental discussions are probably rather effective, particularly in the police area. I do not think Interpol or other international cooperative police efforts publicize all of their techniques. It would be a bad thing if they did.

Senator GLENN. Would you propose then no detail controls, except the State Department working out appropriate arrangements with foreign governments—involving NRC or anyone else, involving safeguard arrangements or anything else—rather than going to strict control in this country or a strict international atuhorization control, which IAEA might develop into. You would favor just working this out on a diplomatic basis without any detailed power by any other agency or government here or internationally?

Mr. WALSKE. Well, sir, you said something about just the State Department and I do not think they have to be trivial. They should——

Senator GLENN. Let me put it differently, solely the State Department.

Mr. WALSKE. All right. I think the State Department is a pretty conservative organization, especially in having dealt with them from the vantage point of the Pentagon. I believe as a matter of fact that with the advice of the NRC and others that they would act rather conservatively in these matters. Beyond that I also believe that Congress serves a very useful function in being informed on what is going on in these areas and being able to take important action when necessary and when the system is not working as it should work.

So I believe, based on years of contact with the type of security arrangements that have been used internationally both in the weapons area and also with regard to the IAEA and Agreements for Cooperation in the civil area, that there is no reason at all why our basic past procedures cannot be extended rather effectively to include safeguards against the criminal elements abroad.

Senator GLENN. You comment by saying, "The need to urge upon new entrants into the nuclear power field that they enter into regional type arrangements for reprocessing nuclear fuel." That may be satisfactory now, but I think probably within a few years you will find whole new means of reprocessing and enrichment—who knows what type of formula it will take for scientific advancement. But I think the ability to reprocess plutonium and enrich uranium would become more common probably. It seems to me it might be sitting up something that is not going to be realistic for a few years down the road, if all precedents in scientific development can be relied upon.

Mr. WALSKE. Well, I follow you very well. I agree with you that—I think the thrust of what you are saying is that a reprocessing plant could be a small one. After all the Indians apparently separated their plutonium from a pilot scale plant that could not have been terribly expensive. Enrichment may get simpler as centrifuges are proven out and also perhaps larger enrichment is proven out and these could lead to smaller plants. I think that would increase the difficulty, no question about it.

The principle that I am enunciating does not depend entirely upon the size of the plant and upon the capital investment required, although today that is a major factor. The principle I am enunciating is to urge people to enter into joint undertakings with regard to these plants. And in that way, I think that they will be more open. They will be more visible, and visibility with regard to national proliferation is a very valuable thing. In fact, that is the whole principle of IAEA safeguards, to keep visible what is happening to the special nuclear material when it is in the cycle.

Senator GLENN. I want to request, just for the record, so that we know the groups and the wide diversity of the groups that you represent, for the record, a list of the members of the Atomic Industrial Forum.

Mr. WALSKE. We would be glad to do that.

Senator GLENN. Thank you very much, Mr. Walske. We appreciate your testimony and your statement.

Mr. WALSKE. Thank you.

[The prepared statement of Mr. Walske with attachment follow:]

Statement of Carl Walske
President of the Atomic Industrial Forum, Inc.
before the Committee on Govermnent Operations
Senate of the United States

May 1, 1975

Mr. Chairman and other members of the Senate Committee on Government Operations, I am pleased to appear here, albeit on fairly short notice, in response to your request.

The Atomic Industrial Forum, Inc., of which I am the President is an association of some 625 member organizations which share a common interest in the development of the peaceful uses of atomic energy. Our member organizations come from a broad spectrum: electric utilities, reactor and component manufacturers, architect-engineer-constructors, fuel cycle service companies including uranium miners and millers, financial institutions, law firms, insurance companies, universities, government agencies and private consultants. About 20 percent of our membership is from abroad.

I should make it clear however, that the views I am presenting today are my own and not necessarily those of the Forum's members. I believe, though, that most of the Forum's members would agree with my views.

The bill before you, S1439, has as its evident objectives the inhibition of nuclear proliferation and, in addition, the promulgation of adequate nuclear safeguards against illicit uses of special nuclear materials. Those are laudable objectives to which I personnaly fully subscribe. Based on many impressions that I have from discussions in the U.S. and abroad I feel the nuclear industry, too, fully agrees with the bill's objectives.

We all struggle with the question of how best to achieve our objectives. Years ago the U.S. was in such a dominant position with regard to nuclear technology and the supply of nuclear services, such as the enriching of uranium, that perhaps it could have dictated the substance of international arrangements for commerce in nuclear technology. In fact we did not dictate, but instead chose to influence others by persuasion and leadership. In general we achieved what we set out to achieve.

For example, the treaty on non-proliferation came into being. The safeguards system of IAEA exists today. The export of highly enriched uranium, to the extent it was exported, took place under the controls for which we asked.

While the danger of additional nations becoming nuclear weapon powers was recognized years ago, the possible threat from terrorists or criminals has only recently been recognized. This is a different matter. It is not a question of national intentions with all their military, economic and foreign policy ramifications. Safeguards against criminal elements are different and depend in essence on the same type of physical protection given to any very valuable material.

With the recent recognition of the threat of diversion by criminal elements, the U. S. has increased the priority on avoiding it. We have all been impressed as acts of terrorism and violence increased throughout the world. In every country political leaders are anxious to provide adequate safeguards against the seizure of special nuclear materials by criminal elements.

In the present situation it seems to me that the most effective approach to improving safeguards against criminal elements must be based on cooperative international efforts, both bilaterally and multilaterally through IAEA or some other organizational arrangement. We cannot dictate at this point, because we are only one of many possible suppliers for nuclear materials and technology.

On the other hand with regard to nuclear proliferation we must, I believe, in our new agreements for cooperation take such steps as we can to inhibit proliferation. I have in mind, in particular, the need to urge upon new entrants into the nuclear power field that they enter into regional type arrangements for reprocessing nuclear fuel. It is, of course, only at this stage that weapons grade material becomes available from the operation of most current reactor types. By avoiding the proliferation of nationally operated reprocessing plants, we may mitigate the problem of new nations becoming nuclear weapons powers. Incidentally, because of the economics of reprocessing nuclear fuel it makes good sense commercially to pool reprocessing capacity.

Applying my philosophy to S.1439 I suggest that it would be more effective if it were modified to:

(1) make the State Department, as the foreign policy agent of the President, the ultimate judge of whether nuclear exports were advisable, based on advice from NRC, ERDA, DOD, ~~and~~ our intelligence services,

(2) recognize that adequate safeguards are a function not only of the level of physical protection, but also of the threat existing in any country.

(3) call upon the Executive Branch to proceed more on a cooperative path with other countries than on the basis of a U.S. veto.

With that short statement I would be pleased to have any questions that you may choose to ask.

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Carl Walske
President

May 12, 1975

GOVERNMENT OPERATIONS COMM.
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MAY 14 1975
WASHINGTON, D. C. 20510

Senator Abraham Ribicoff
United States Senate
Committee on Government Operations
Washington, D. C. 20510

Dear Senator Ribicoff:

Thank you for your letter and questions regarding my testimony at the hearing of the Committee on Government Operations of the U.S. Senate, May 1, 1975. I, too, am sorry that you were unable to be at the hearing. Some of your questions should more appropriately be addressed to government officials, however, I shall give you my own answers, drawing in part on my experience as Assistant to the Secretary of Defense (Atomic Energy) from 1966 to 1973. All of my answers are my own and not those of the Atomic Industrial Forum, Inc., although I do believe my views are generally compatible with those of most of our member organizations.

"1. We have heard testimony from Dr. Ikle and other experts to the effect that a close relationship exists between the export of peaceful nuclear technology and the proliferation of nuclear weapons.

"(a) Do you agree?
"(b) Are you and other representatives of the nuclear industry concerned?
"(c) What are you doing about it?"

Countries with nuclear power programs generally have the know-how and access to proceed with or without the U.S. At this stage there is no way that they can be dictated to by the U.S. as regards whether or not they initiate a nuclear weapon program. We can, however, influence them through diplomatic processes.

Countries which have had little or no experience with civil nuclear power would certainly be assisted in achieving a nuclear weapons program by being provided with nuclear power reactors and associated facilities. It should be noted, however, that all the basic nuclear power technology has been published, so there are no special secrets.

Furthermore, modern nuclear power reactors involve investments ranging into the hundreds of millions of dollars. Any recipient country which chose to use the plutonium generated in such reactors for a nuclear weapons program would put at peril its supply of enriched uranium to fuel the reactor, if it is of the type used and sold by U.S. companies. Under those circumstances it is very unlikely that any of the nations which can enrich uranium (US, UK, France, USSR and PRC) would supply or continue to supply enriched uranium for fuel. That would mean that the reactor would be useless, negating a heavy investment and a major source of electric power.

Any such nation, desirous of achieving a nuclear weapons capability, has a much more logical route to follow. For a few tens of millions of dollars it could build a research-sized reactor, fueled with natural uranium. This sum would also cover a pilot plant for processing plutonium from the fuel. All this could be done with indigenous technical capability by essentially any of the countries which are likely to want a nuclear weapons capability. The technology has all been published and it is a much less demanding technology than that associated with nuclear power reactors.

Of course, everyone is concerned about nuclear proliferation. That, however, does not automatically justify every idea advanced for a solution. The simple fact is that the United States cannot dictate a solution as S.1439 would strive to do. The resources and technology of nuclear energy are available to many nations, independently of the U.S., hence we can only progress through persuasion, leadership, and setting a good example, domestically. The history of the negotiations leading to the Non-Proliferation Treaty bring this out clearly. Industry wholeheartedly supports such initiatives by the government.

"2. Why wasn't the nuclear terrorist threat recognized years ago? Dr. Ted Taylor was writing confidential memos on the problem to Federal agencies and the IAEA as far back as 1965. It was only when he went public on the problem that the government and the industry began to acknowledge it.

"(a) Why weren't his earliest warnings, as well as the activities of the PLO, the IRA, the Minuteman, heeded at the time?

"(b) Why were warnings about the dangers of nuclear theft and of crude nuclear weapons attacked by the nuclear industry and the AEC as "exaggerations" and "scare tactics" as recently as a year ago?"

Your questions imply that the government should have moved earlier in recognition of terrorist type threats. I agree. You also state that industry and governmental personalities have labeled the dangers of nuclear theft and crude nuclear weapons as "exaggerations" and "scare tactics". I generally disagree with that view though I do believe that there has been some overdramatizing of the problems. Even so, I take the threat as being sufficiently serious so that it must be dealt with effectively. Most responsible leaders in government and industry seem to take the same view.

Your questions imply that industry was slow to respond. I think that is an unfair charge. Industry had no knowledge of Dr. Ted Taylor's confidential memos, nor did industry have knowledge of the ease with which crude weapons could be fashioned from reactor grade plutonium. Taylor put that in the public record only about two years ago.

It is not correct to imply that Taylor's publicity caused the federal government to initiate action. The regulations on safeguards set forth by the AEC in the fall of 1973 had their genesis at least a year earlier. The main effect of Taylor's efforts was to speed up the issuance by about six months. Since then his efforts have also undoubtedly served as a spur to the AEC and NRC to study and to make further improvements, but it is incorrect to assume that we would not have moved forward without the publicity.

On the other hand, the publicity attendant to Taylor's efforts have in my opinion increased the actual threat level at least tenfold. I argued privately and unsuccessfully over the years that a little more patience and a lot less publicity would better protect the public interest. One has only to look at the contagious nature of new criminal techniques - skyjacking, for example - to drive home the point.

"3. When the U.S. was in the dominent position you describe with respect to supplying nuclear technology and materials, why didn't we dictate strict safeguards specifications on all of our nuclear exports, in keeping with our vital common defense and security interests?

"(a) For example, why didn't we require uniform physical security measures?
"(b) Why didn't we require tougher materials-accounting safeguards than those now applied by the IAEA?
"(c) Perhaps of most significance from an industry standpoint, why didn't we refuse to export our nuclear designs and other technology to future nuclear rivals like France and West Germany unless they agreed to apply safeguards comparable to ours on their nuclear exports?"

In retrospect we probably should have done more. At the time we dealt with the threats as they were then understood and we negotiated bilaterally and through IAEA the safeguards arrangements we thought necessary for dealing with the perceived threats.

"4. If the world's national leaders are as concerned about the threat of nuclear theft as you say, why aren't uniform physical security measures being adopted at the NPT Review Conference in Geneva next week?

"(a) Why can't the U.S. get other nations to sign an international convention on physical security?
"(b) If the threat and the need are so great, why can't we apply tough physical security conditions on our exports, at least over the next 3 to 5 years---the expected duration of our virtual monopoly over supplying enriched uranium fuel to the Free World?

Your questions make assumptions about the future. I remain confident that cooperation on physical security measures will prove completely achievable. As I indicated at your committee's hearing, however, bilateral negotiations on physical security are probably much more practical than multi-lateral negotiations. Each country has special law enforcement considerations. Most countries want to keep their security measures confidential in order that they not be compromised. Bilateral negotiations help in this.

"5. If we made the State Department the lead nuclear export agency as you suggest, how could we guarantee that technical safeguards judgments would be made independent of foreign-policy and trade considerations?

"(a) Don't we need these technical judgments to be made by an independent regulatory agency like the NRC?"

I believe that foreign policy and trade considerations should play a part in decision-making, but also we must be satisfied that our national security interests are satisfied. The State Department is in a much better position than NRC to pull the whole picture together.

"6. The Committee heard testimony from ERDA representatives that U.S. sales of uranium and uranium-enrichment services abroad last year totaled $421 million, and that expected sales over the next decade would come to about $5 billion at today's prices. This is an addition to about $2 billion in annual sales abroad by the U.S. nuclear industry.

"(a) Do these figures correspond to your own?
"(b) Can you give us a comparative breakdown of such sales by other nations?"

I have no figures of this kind. I believe Representative Price of the Joint Committee on Atomic Energy was the source of the figures you quote.

Sincerely,

Carl Walske

CW:cp

February 1, 1975

ATOMIC INDUSTRIAL FORUM, INC.
ORGANIZATION MEMBERS

Abbott Laboratories

Abraham & Co.

Aerojet Nuclear Company

Aetna Life & Casualty Insurance Companies

Agricola Metals Corporation

AiResearch Manufacturing Company
A Division of The Garrett Corporation

* Alabama Power Company

Alexander & Alexander, Inc.

* Allegheny Power Service Corporation

Allegheny Power System, Inc.

Allendale Mutual Insurance Company

Allied Chemical Corporation

Allied-General Nuclear Services

AMAX Specialty Metals Corporation
A Subsidiary of American Metal Climax, Inc

American Air Filter Company, Inc.

* American Electric Power Co. Inc.

American Electric Power Service Corporation

American International Group

American Nuclear Corp.

The Anaconda Company

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Senator GLENN. Mr. Adrian Fisher. Mr. Fisher is dean at the University of Georgetown and a former U.S. negotiator of the Nuclear Non-Proliferation Treaty.

TESTIMONY OF ADRIAN FISHER, DEAN, GEORGETOWN UNIVERSITY LAW CENTER, FORMER U.S. NEGOTIATOR OF THE NUCLEAR NONPROLIFERATION TREATY

Senator GLENN. Do you have a prepared statement you wish to enter into the record or what is your pleasure?

Mr. FISHER. Mr. Chairman, because of the timing of my invitation to appear, I do not have a prepared statement. I would just like to say a few words about the bill and then submit myself to attempt to answer your questions.

Senator GLENN. Fine.

Mr. FISHER. The purposes of the bill in terms of getting a centralized control over the problem of exports of nuclear materials and the relation of that to the Nonproliferation Treaty is, I think, very, very good. Although various stages of my career, I have worked with practically every agency that is mentioned in your bill, the State Department, the Commerce Department, the old Atomic Energy Commission and the——

Senator GLENN. You are the renaissance man we have been looking for.

Mr. FISHER. No, I just could not hold down a job. That was my problem.

But I do not have any strong thoughts about where you put the power except to thoroughly support the concept of a nuclear proliferation assessment stage in section 8 of the bill. That is consistent with what the House is doing in the new authorization legislation for the Arms Control and Disarmament Agency requiring, in effect, a form of impact statement—that the International Relations Committee is so considering.

But the thing I would like to direct my attention to are two issues of policy that are raised by the bill, Mr. Chairman.

First: There is an area in which the U.S. policy—to avoid any appearance of partisanship and this goes back with many demonstrations —which in my judgment has been erroneous. The U.S. policy has been a strong supporter of safeguards of the material that we export. However, we have been rather benignly neglectful of the attitude of the indigenous operations of the country to which exporting nuclear material.

I am not suggesting that that is a violation of the Nonproliferation Treaty. I think a reasonable interpretation of article III of that treaty is that all that is required is that the materials exported be subject to safeguards.

On the other hand, the Canadian experience with the Indian Government has shown that there are certain dangers of building up a nuclear industry on the one hand, but thoroughly safeguarded, and having an indigenous industry on the other hand, not subject to safeguards because you cannot put any safeguards on the brain of a man. When you build up an industry and build up a know-how, if there are nonsafeguarded around, you have really gone contrary to the direction of the Nonproliferation Treaty. I think the Indian-Canadian experience is an illustration of that.

We are doing the same thing with respect to quite a few countries in which we are requiring our material to be subject to safeguards. But we really do not care about the other nuclear activities.

See, we are in the danger of really—this policy seems to be wrong in two ways, Mr. Chairman. One is the diversion thing which I indicated. You build up an industry and then it can be developed in nuclear weapons with indigenous material.

And second, safeguards work best if the whole ball of wax is under them, because the whole nature of the material controls.

So I would recommend that the statement of policy by the Senate that the United States start moving in the direction of requiring as a precondition with enriched nuclear systems, the acceptance of complete IAEA safeguards. Now, we cannot do that completely, because we already have some contracts. We already have agreements.

Senator GLENN. What was that again? To put it all under IAEA safeguards?

Mr. FISHER. We will say, "Look, it isn't just enough that you put the material that we supply you in the safeguard. If you are a nonnuclear power, unless all of your nuclear activities are under safeguards, we are not going to assist you." Such a policy would require cooperation with France.

On the other hand, the French, even though they have not signed the Nonproliferation Treaty have taken the public position, and I believe them, they are going to act as if they were a party to it. They stated that in the Security Council of the United Nations in June of 1968 and they have said it at every occasion since then.

Senator GLENN. Why didn't they sign it?

Mr. FISHER. That involves some segment of French psychology that I think is a little bit hard for me to explain.

Paraphrasing Mr. Churchill's saying, the hardest cross he had to bear was the cross of Lorraine.

Many of my friends say that we ought to say, "Look, join the treaty or we are not going to assist you." I think—while I would like to do that, I do not think we could make it stick. We clearly could not get French cooperation on that. We might, however, get cooperation on an increasingly severe program of not giving nuclear assistance to countries who are only put under safeguards the portion that we assist them.

I think generally leaning in that direction would make a possible repetition of—what I refer to and it is almost slang—the Canadian-Indian syndrome of less more than likely, which is exactly what happened there in leading a rather irritated Prime Minister of Canada and leaving the relations between the two countries on rather a bad basis.

So much for one change in policy, that is, as long as our material is safeguarded we do not really care. As I say, I do not think we could require adherence to the treaty as a precondition for exports, because that, I think, would be interpreted as blackmail.

On the other hand, everyone loves the IAEA in requiring increased acceptance of IAEA safeguards across the board would not be interpreted as blackmail, and the chances of getting the French cooperation on that seem to me to be greater than they would be if you——

Senator GLENN. Would you give IAEA more authority if everybody sort of generally accepted their viewpoint or looked at them as the lead dog in this international effort? Doesn't IAEA act as an information gathering, a monitoring service at the present time? Would you give them more authority and control or keep them as they are?

Mr. FISHER. Well, I think you have to give them more support. In terms of legal authority, I do not think you can give them much more authority and control without running into problems of the members of the IAEA.

Senator GLENN. Of course, this bill, that we are discussing, would set up our own interagency operations here in this country. To get back to the bill, the question is whether we give NRC a veto, or go to IAEA, or give it to the State Department, as Mr. Walske indicated he would like to have done. There are all sorts of ways we can approach this.

If we were to give the only veto to IAEA, turning over our operations more or less to an international organization, it would be an entirely different agency—an agency to coordinate the problem in this country—than it would be if we retain the veto in NRC, make Commerce the lead agency to coordinate business interest, and get other agencies to sign off on export licenses before they are put into effect.

It would be a different operation if we were contemplating that it would be a better idea to go with the full IAEA authority.

Mr. FISHER. Well, I do not think it is realistic to think in terms of full IAEA sort of quasi-governmental type of authority. I do not think the IAEA is going to be anything more than a monitor. But having said more than a monitor, a really good effective reservoir, particularly when you have at least three of the major nuclear powers in agreement with the Nonproliferation Treaty——

Senator GLENN. Let's take that. As they blow the whistle then what happens?

Mr. FISHER. Well, I assume that if their safeguard system has been violated the other parties to the Nonproliferation Treaty would break off any form of nuclear assistance to them.

Senator GLENN. We had some problems in previous testimony along the lines that it is all nice and good to have information, but what happens at that point. It does not do much good to have the information unless there is some follow-up on it.

Mr. FISHER. I think any party to the Nonproliferation Treaty would be justified in withholding any form of nuclear—in fact, they would be required to withhold any form of nuclear assistance if the IAEA had blown the whistle and that problem had not been satisfactorily resolved.

Senator GLENN. Are you satisfied with the safeguard provisions as finally negotiated by the Nonproliferation Treaty?

Mr. **Fisher**. Well——

Senator **Glenn**. You must have been or you would not have signed off on it.

Mr. **Fisher**. Well, I was satisfied that they were the best we could get in that they were better than nothing. You can play worse case arguments on the safeguard system of the Nonproliferation Treaty or any safeguard system. Just like you can play worse case arguments on—as we use to do gaming various control problems, what happens if the Soviets cheat this way or that way. You can always play worse case arguments.

But on the whole, I think it is the best achievable.

Senator **Glenn**. Under Nonproliferation Treaty, I do not believe there is any difficulty in getting a system for safeguarding nuclear materials against a terrorist attack. Would it be just left to the commonsense of the host country to take care of that? Everyone is—as Mr. Walske pointed out—everyone is concerned with the terrorist aspect. We do not have to tell them about being concerned with terrorist attacks. They already are. Were there any requirements discussed in the Nonproliferation Treaty negotiations with regard to that?

Mr. **Fisher**. No, there were not. Mr. Chairman, the Nonproliferation Treaty negotiations represent in some ways a classic case book story on how not to negotiate an agreement, because the principal problem of safeguards was left open. The Nonproliferation Treaty merely said the parties agree to negotiate safeguards with the IAEA. Now, you can say it and that is silly. It is an agreement to agree. It is just meaningly.

Senator **Glenn**. IAEA negotiates these in secret and you never know what happens with the negotiations.

Mr. **Fisher**. Well, not really. The principal thing the Soviets were concerned about, about safeguards was the IAEA EURATOM Agreement. That has worked out pretty well. No one is really concerned that there is any cheating under the arrangement that IAEA and EURATOM have worked out. So by and large the notion—even a professor in international negotiations which is what I seem to be now to make fun of this technique of negotiating it—as a practical matter, it was the only way you could do it. Because if you had made a precondition for the signing of the Nonproliferation Treaty, the IAEA agreement with all the various other groups, Japan, EURATOM and others, you would not have had it yet.

Senator **Glenn**. Do you think we in the United States are in violation of the Nonproliferation Treaty by licensing nuclear exports to nonNonproliferation Treaty countries such as India or Africa that have not placed all of their nuclear facilities and materials under IAEA safeguards? Are we in violation of our own agreement?

Mr. **Fisher**. I do not believe so, Mr. Chairman. When the agreement was presented to the Senate that point was raised. And the point was made, and one can say a reasonable man could make it, at least I am committed to that proposition, erroneously or not, because I made it, that as long as the materials that we supplied were under safeguards that that was all that was required under the treaty.

But the problem is, the fact that you can do it under the treaty, without violating the treaty, does not mean you have to.

We are in a situation now where many of the parties with which we are assisting, say Argentina and Brazil, are under a positive incentive not to sign the treaty. Why should they put other things under safeguards when they can get from us as long as the material they get from us have safeguards?

Well, I felt that the opposite point of view, say amend the treaty to say either sign or you don't get anything, might be counter productive. On the other hand, there is clearly no obligation under the treaty to supply anything to nonparties.

Senator GLENN. That was just along the line I was going to ask you about. What legislation might you introduce to implement the policies you are advocating here?

If we insist on uniform application of IAEA safeguards covering all the facilities, what would this do to our commercial enterprise? Would France jump in or would we pretty much eliminate ourselves from the whole international commercial picture and lose whatever influence we had there?

Mr. FISHER. I think it might be a little extreme to say as of July 1 no more unless everything is under IAEA safeguards. But a statement of policy by the Senate, that is the way the United States is leaning into trying to do in cooperation with other nuclear suppliers. That does not seem to me to present a problem. As far as I know, we have never really negotiated with the French along these lines.

I would just like to add one thing in that I agree with Mr. Walske about the problem of the impact of original reprocessing. It may well be that all of our technology you indicate, Mr. Chairman, would be obsolete in another 10 years, but you cannot plan on that. Under the circumstances then, it seems to me that the combination of economics and the politics of the nonproliferation both go together with respect to increasing our regional fuel cycle. It does make things much more highly visible.

One of the things that held up this treaty for almost a year was making the arrangements for EURATOM and IAEA. I was not worried about that. I had a good deal of trouble persuading my associate colleagues that this was going to be workable. But I personally feel that the combination of the IAEA and the Europeans and national plants is probably a more workable combination. So I think it is good. The whole notion of working towards—in other areas towards the regional fuel cycle is, I think, a policy that is more healthy rather than unhealthy.

Senator GLENN. Having been through all of this and being an expert in this area, how much fear and trepidation do you have, for instance, with respect to China being outside the NPT. Do you think they behaved irresponsibly? I know we would like to see everyone agree to the same treaty that we agreed to. That is not quite the real world we are operating in. Does this represent a real hazard or should we renegotiate the whole thing? Should our regulatory processes here reflect any different attitude in having commercial plants abroad since China and France both have the capability to provide some of these same facilities?

Mr. FISHER. I am not sure about the Chinese economic capability.

Senator GLENN. I would presume it is coming along.

Mr. FISHER. It is coming along.

The French, however, generally speaking, say that they do not want to facilitate the spread of nuclear weapons. And they have been rather astute in requiring the material that they supply be subject to safeguards.

It is very hard for me to be critical of the French for saying that they do not require the entire industry to be subject to safeguards, because I once raised that question to a Frenchman. And he said, "Well, you don't either." That was rather the shortest discussion in history, particularly for me.

Senator GLENN. How serious a development, in terms of weapons, do you see in the South African breakthrough in uranium enrichment? Does this make for a whole different concept? Is it going to require changes in Nonproliferation Treaty?

Mr. FISHER. I do not think it means that much if the principal support for the Nonproliferation Treaty is we are prepared to do other things to support in terms of political will. For example, with the current discussion with the Geneva Review Conference Treaty, I cannot understand why we are not prepared to enter into a nonuse pledge with respect to the nonnuclear powers who are not attacking someone in concert with a nuclear power. Why we get so fussy about a nonuse pledge on the one hand and say, "We won't promise to bomb you, but please don't develop the things themselves." It seems to me that is a rather hard position to sustain very long.

We got away with it—that is the wrong way of saying it—the old concept of security assurance is under the Nonproliferation Treaty many people said it did not make any sense in the first place. Again, I am committed to the proposition that it did because I worked them out. But on the other hand, it is based on the assumption that if we and the Soviets agreed to something the Security Council would have to stick to it. That assumption seems to me to have disappeared somewhere 2 or 3 years ago with the advent of the Chinese People's Republic in the Security Council.

Senator GLENN. As long as there is a seminuclear monopoly in the world I think—I presume in your testimony here this morning you think we have gotten a few steps beyond those days when we could really put everything under an international management. It might have been possible at that time. Do you feel we are beyond that stage now?

Mr. FISHER. Yes, Mr. Chairman, I do. In my discussions—when I was in the Government and informally since then with the Soviet Union officials does not change my mind any on that. I think we are further down that road.

I just came in the room when Mr. Percy was talking about the issue was nuclear power here to stay, and the answer is, of course, internationally it is. There are many countries in the world that are critical of the United States on the grounds we have not been supportive enough in the obligation for the peaceful uses of nuclear energy. Some of them are even critical that we have not been supportive enough of the peaceful explosions, which I regard to be—that is the so-called plowshare program, which I think is basically a hoax. I do not think it really exists. But it is a hoax that we created and we are unfortunately living with. It is awfully hard to explain to a representative from another country that something that is printed on U.S. Government stationery—do not pay any attention to it.

Senator GLENN. Do you have any other comment on the bill, specifically, as to the proposed licensing arrangements, or controls, or vetoes, and so on before we close here?

Mr. FISHER. Only if you could insert in it in some form of finding a policy of pushing a little bit in the direction of total IAEA safeguards.

Senator GLENN. What was that?

Mr. FISHER. Pushing in the direction of making a requirement, not an absolute requirement, but a total acceptance of IAEA safeguards. Also if you could make a slight push, Mr. Chairman, in the direction of a regional fuel cycle, I think it would be helpful in the cause of peace.

Senator GLENN. Do you think that NRC is the agency most capable of pushing toward acceptable IAEA safeguards? They have the expertise and should they be the ones outside the 3 executive branch of Government to do that?

Mr. FISHER. I am not sure about that, Mr. Chairman. I do not really have any—I do not know the names and numbers of the players well enough now to have any strong feeling about it.

I do think the nuclear proliferation assessment statement required by section VIII, that was very good. That gives Mr. Ikle and his successors a chance to comment on things they are vitally interested in.

Senator GLENN. Thank you.

Our next witness will be Mr. Gene La Rocque, director of the Center for Defense Information.

I believe you did submit a statement in advance. Would you care to have that placed in the record or read it or summarize it? What is your pleasure?

TESTIMONY OF GENE LA ROCQUE, DIRECTOR OF THE CENTER FOR DEFENSE INFORMATION

Admiral LA ROCQUE. Thank you, Mr. Chairman. How is our time? I would really like to read it. It would take about 7 or 8 minutes, if there is time enough?

Senator GLENN. Sure. If your time is all right, ours is. We have at least a half hour. That would be enough time to do it.

Admiral LA ROCQUE. Thank you. Mr. Chairman.

I thank you for this invitation to discuss with you some of the provisions of the Export Reorganization Act of 1975. The Center for Defense Information has been concerned for a long time with the control and regulation of the export of arms, ammunition, and implements of war as well as nuclear materials and technology and is delighted to see that this committee shares our concern with this matter. It is a matter which has a major impact on U.S. foreign policy and U.S. national defense policy. I share with this committee a strong commitment to improving the efficiency and economy of the operations of the executive branch. More than 31 years in the Navy have made me acutely aware of the many ways in which the efficiency of the executive branch can be improved.

Mr. Chairman, the Center for Defense Information has just prepared a very brief analysis of this whole matter of arm sales, and particularly to the Persian Gulf. It is a complementary piece to Senator Percy's very excellent report of his visit there. I think it would make a useful addition to this committee's report, if you were willing to have that for your record.[1]

The export of the munitions of war by the U.S. Government is growing at a rapid pace. While grant military assistance by the United States has declined in recent years from $5.7 billion in 1952 to about $600 million a year in recent years, foreign military sales have sharply increased. U.S. foreign military sales orders have grown from less than $2 billion in 1971 to more than $9 billion in 1974. This includes $8.2 billion sold on a government to government basis and about $1 billion in commercial sales. This makes the United States the largest exporter of arms in the world.

Orders for U.S. weapons in 1974 increased dramatically and were almost as large as total world arms exports in 1973. In other words, in 1974 we sold in arms about as much as the entire world sold in 1973.

There is every reason to expect that U.S. foreign military sales in 1975 will be at least as large. The first 9-month figures are available and it shows it is going to be up over $10 billion this year. For this reason S. 1439 is a particularly significant piece of legislation.

It is essential to keep in mind that arms sales—whether on a government to government basis or on a commercial basis—constitute the first steps toward a U.S. commitment to the government of the purchasing country. Sales of U.S. weapons are normally followed by U.S. soldiers, sailors, and airmen as well as U.S. civilian technicians who become actively involved in training foreigners to use and service U.S. weapons. In Iran, there will be up to 19,000 U.S. citizens, including their dependents, by this summer.

I understand also by 1980 it is expected there will be 40,000 U.S. citizens there in an advisory capacity, including their dependents. So the number is growing rapidly. Since this appears to be unavoidable, it is imperative that no weapon be sold to a foreign government unless the sale is in consonance with our foreign policy and contributes to our national defense. Many recent U.S. arms sales, particularly in the Middle East, appear to have been made without an in-depth consideration of their long-term impact on U.S. foreign policy and national defense.

The region of the world that has been the largest customer for U.S. arms is the Middle East—including the Persian Gulf. Seventy-nine percent of the dollar value of orders for U.S. arms in 1974 came from the Near East. Within the Near East area, the Persian Gulf has been the largest customer for U.S. weapons. In 1974 the United States sold more than $4.4 billion worth of weapons to Persian Gulf countries, most of this amount to Iran and Saudi Arabia. The United States is not the only supplier of arms to the Persian Gulf, but it is by far the largest. By comparison, the Soviets sold $1.5 billion of arms last year to the Persian Gulf countries; the

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[1] See appendix p. 473.

French sold $1.5 billion; the British sold $50 million. In all, the United States sold 59 percent of the weapons purchased by Persian Gulf countries in 1974.

The character of U.S. arms sales has undergone major changes in recent years. In the past, it was unusual for the United States or any other country to sell its most advanced weapons to foreign governments. With the possible exception of some favored allies, foreign purchasers of U.S. arms had to content themselves with older and obsolescent equipment. This pattern has changed quite radically in recent years particularly in the Persian Gulf and Middle East, where oil-rich governments can afford to pay for the most up-to-date equipment. Beginning in the mid-1960's, Iran began acquiring the F-4 Phantom which was, and still is, one of the first-line fighter aircraft of the U.S. Air Force and Navy. Iran has recently purchased and will soon begin to receive sophisticated and expensive F-14 fighters from the United States. It is scheduled to get these aircraft in 1976, only 21 months after the first F-14's were placed in the U.S. Navy's inventory.

As you know, Mr. Chairman, we are splitting our procurement this year of F-14's with the Iranians. We have gone to some lengths to accommodate the Iranians. Iran will also be adding the oceangoing DD-963 Spruance Class destroyers to its Navy. As you know, it is about 8,000 tons. It is really a cruiser. It is bigger than some of the Soviet cruisers which are as small as 6,000 tons. Iran and Saudi Arabia will soon receive improved Hawk surface-to-air missiles and Iran has TOW antitank missiles, both being added to the U.S. inventory. The fundamental point is that the sophistication of weapons available to the countries of the Persian Gulf and to other U.S. arms customers has escalated substantially in recent years and a full scale war in the region is likely to prove highly destructive and very costly. A war in the Persian Gulf would obviously be counterproductive to U.S. national interests.

There is another way in which U.S. arms sales have changed in recent years. In past years, the United States gave military assistance to countries that could contribute to the defense of the United States. This is no longer the case.

We introduced something, Mr. Chairman, called Annex J—of the joint strategic operations plan—in the joint staff. We would list in there the amount of weapons we thought each country ought to have. Nowadays, the primary emphasis is on what can be conveniently sold and has very little relationship to our own national defense.

We must also ask whether the United States may also be creating military powers that some day will turn against us.

Many of these advanced long-range weapons such as the F-4, F-14, and DD-963 destroyers supplied, or about to be supplied to Iran, have military implications beyond the Persian Gulf. The Iranian military build-up and Iranian aid to Pakistan—Iran has given 90 F-86 jets and several modern C-130 transports to Pakistan—could in the future be seen as a threat by India. At present Iranian-Indian relations are cordial, but a continued Iranian build-up and more Iranian aid to Pakistan could cause the relations between these two countries to sour over the next few years. In similar fashion Saudi and Kuwait arms may soon have an impact on the Arab-Israeli military balance.

As Saudi Arabia and Kuwait grow in power the Israelis may have to begin to weigh them in the total balance. This may make the Israelis less secure and undermine a key tenet of U.S. policy which is to insure the survival of Israel. It may also increase Israel's need for military assistance and cost the U.S. money in the long run.

The two largest purchasers of U.S. weapons in the Persian Gulf area—Iran and Saudi Arabia—are traditional rivals. At the root of their rivalry are a number of long-standing differences. Saudi Arabia has been a strong opponent of Israel and a supporter of Israel's Arab enemies while Iran has quietly supported Israel and continued to sell oil to Israel. Finally, and most important of all, the Shah's ambitions to be the dominant power in the Gulf clash with Saudi aspirations and undoubtedly make the Saudis uneasy about their own security.

U.S. sales of arms to Iran and Saudi Arabia can only serve to further increase tensions and reduce the chances of peaceful cooperation. Arming one power leads in turn to increased demands for arms by the other. Such a policy stimulates business for U.S. arms manufacturers, improves our balance of trade, and may in the short run gain a few friends. In the long run we will probably rue the day we sold all these modern weapons to Iran and Saudi Arabia.

The provisions of the bill which deal with the problems of nuclear proliferation—sections 7 and 8—are of considerable importance. It has been my long-standing view that the most serious danger here is that nuclear weapons or special nuclear materials might fall into the hands of terrorist groups. More than 50 major terrorist groups are reported to exist worldwide. Their recent activities—murder, kidnapping, hijacking, blackmail—are well known to members of this committee. Efforts at preventing proliferation should be directed at keeping nuclear weapons and the materials to make them out of the hands of these groups. This is a goal that all present and future nuclear nations are likely to share and as a result international agreements in furtherance of this objective should be actively pursued. When one considers these many potential dangers and potential threats to U.S. security that could develop from the sale of weapons and the export of other strategic materials by the United States, it becomes clear that the ability of the executive branch to fully assess these long-term dangers needs to be improved. We are hopeful that the legislation proposed by this committee can improve these capabilities, and at the same time provide the Congress with an opportunity to participate in the process.

Unrestrained weapons sales based on the State Department's view of our national interests may again result in the Congress coming in on "crash landings" without having had an opportunity to review the flight schedule.

I would recommend that where arms sales to any one country exceed $50 million for 1 year or include first-line U.S. equipment, the executive branch be required to submit to the Congress a foreign policy impact statement prior to the sale.

In addition, I would suggest that the Secretary of State be required to transmit his written approval for the export of arms to the Congress along with a full explanation of the reasons for his approval.

That completes my statement, Mr. Chairman. I would be happy to discuss any aspects of it or anything else.

Senator GLENN. Thank you.

Would it be fair to say from your testimony you feel that the commercial industry sort of has overriden our national security interest in these areas with the U.S. exports of conventional arms as well as nuclear technology?

Admiral LA ROCQUE. Yes, sir. That is precisely my point. That is the trouble I have with this S. 1439 in that it seems to put the primary emphasis on the commercial sales without any guidelines, without any sort of ethical consideration about to whom these sales will be made, and even worse the ultimate impact that these sales will have on our own national defense and our own security.

Senator GLENN. It does apply to several areas in your testimony, although the major thrust of most of your testimony has been in regard to conventional and nuclear weaponry, but it does include other areas.

You suggest a foreign policy impact statement. Would you care to elaborate on that a little bit. We are beginning to have impact statements on anything and everything in this country. We have been getting energy impact statements. We are having environmental impact statements. We are having health impact statements. We are now getting a foreign policy impact statement. Who would control it? Who would pass upon it? I am a little bit vague on this impact statement.

Admiral LA ROCQUE. Since you mentioned some of the other impact statements, Mr. Chairman, I think it has been very helpful to have these environmental impact statements.

Senator GLENN. I might add here, if you do not mind me interrupting you, I did not mean to belittle this in any way, shape, or form. It was a novel title to this that I have not had any exposure to yet. I do realize it was made in a serious tone. I do not mean to slight it at all.

Admiral LA ROCQUE. I do not think you have.

It is one way, I think, of bridging the gap between the executive branch and the Congress. It is one way of insuring a cooperative action in terms of our foreign policy. It is one way of getting the Congress into the act before we have committed ourselves so far down the line that there is nothing they can do but back whatever the executive branch has done.

I think we have learned in Vietnam and elsewhere that we are going to have to draw this country together. The country itself is going to have to be supportive of whatever actions our Government takes.

Too long our executive branch has almost assumed the mantle of our Government, ignoring the Congress—and this is particularly true in foreign policy. This is an attempt to suggest that before the State Department or the executive branch authorizes a sale of $50 million worth of arms, for example, to an area of the world, that they submit to the Congress simple impact statements, just like the Navy submits an impact statement on the construction of a new Trident submarine. This gives people an opportunity at least to know the basis for which the decision was made, the dangers and the advantages for this sale of arms.

Arms sales, in my opinion, far transcend the sale of trucks, or housing equipment, or other commercial ventures partly because the stuff may some day come back to either bite you directly or involve some of your own allies in a situation that causes you then to have to get into a war.

I know our whole system is built on a beautiful capitalistic system. And I would like very much to preserve it, but I think we have to look very carefully at this commercial arms sale.

Senator GLENN. I was interested in your comment on this because almost a month ago now I put in a bill which will come to hearing some time in mid-May before the Judiciary Committee with regard to the executive agreements. As you have indicated, you feel that the executive branch has sort of run off with this area of checks and balances. In that respect, we conducted a 9-year war in Vietnam by an executive agreement for the first time in history. Now, we have the War Powers Act to prevent that. We are in the process of negotiations with Diego Garcia on arms sales on all of these different things around the world by an executive agreement, which prior to the last two or three decades was done by treaties only. We are now using the executive agreements as a bypass treaty.

I know this is not the subject of our hearing today, but I put this bill in—well, it is a bill that Senator Hughes had put in—which was approved last year requiring executive agreements to be sent to the Senate now. But they just sit there and they are there and somebody reviews them, but unless someone picks it up and does something about it, there is no commitment or noncommitment with regard to whatever the President may have proposed to a foreign nation.

The bill I submitted would require that the Senate meet its traditional role of advice and consent as it applies to treaties, but also exercise its role with regard to executive agreements on any executive agreement the President wishes to make that was going to be a commitment of any of our resources in this country. It would require the Senate to either give a yea or nay immediately, or it could lay on the table for 60 days and if nothing was done with it, it would, in fact, become a commitment by this country by our inaction. In that way foreign governments would know exactly what commitment we have in this country and our President would know what commitment he has with the advice and consent of all of the Senate backing him up.

We are a unique Nation here. We do not have a prime minister who—if he goes to make some crazy commitment to give somebody something, such as an arms deal, or a nuclear plant or whatever—when he comes home, can be put out of office by a vote of no confidence.

Our system of checks and balances works a little differently. The Chief Executives in this country in the recent past have somehow learned to bypass this by means of the executive agreement route. I think it is time we redressed that imbalance which is virtually the method of conducting foreign policy around the world.

I did not mean to give a lecture. I did not come here to give a speech. I came to get your information. If the bill goes into effect, it seems to me, it would almost meet the impact statement that you are talking about, at least it would allow us to exercise a role in our role of advice and consent that the founding fathers envisioned us having. I do not think the founding fathers envisioned the day of nuclear weapons, and supersonic airplanes, and moon landings, and a few other things when they set up our traditional treaty arrangement and it took a month and a half to get back and forth to Europe and things like that.

I think we have gradually used this executive agreement mechanism because it is so convenient in a modern world where transportation and communications have shrunk the world to essentially one community. It is easier now to get a message to Europe than it used to be to walk down the other end of whatever village you lived to talk to somebody.

Let's get on with your ideas and not mine.

Admiral La Rocque. That sounds like an excellent bill, Mr. Chairman. It does dovetail exactly the thoughts that I have for the Center for Defense Information about getting the advice to the executive branch before the consent and not just wait and assume that they have it.

Senator Glenn. I was led into this by the fact that when I got to the Senate this morning I had to try to decide whether we give more aid to Vietnam and Cambodia—or don't we. What are our commitments? I do not want to renege on commitments.

We have tried to find out what our commitments are. We asked the State Department, we asked the White House, we asked everybody in sight. We went to the Library of Congress and dug out old newspapers. All of our commitments were couched in terms of well, it was generally understood, or the South Vietnamese understood, and we did not disagree with them so they would accept the fact. Everything was couched in those terms. We went months and months of trying to find out this. I finally gave up.

The President keeps referring to moral obligations and commitments and all of these things, and in light of the letters that came out last night, there were more things written than I was able to find out.

We are no longer in a time that we can afford to just have these various vagaries running around as international peace settlements on foreign policies. It seems to me we have to pin these things down a little, not just to pin a person down—quite the opposite. I think this would strengthen a President's hand in foreign policies because for the first time in modern history foreign countries would now know that when they have an executive agreement they either get or do not get the commitment of the Congress to back up the President. They know what they could rely on. Our President would know what his backing is. There would not be any more of this vague stuff. We do not have an imperial Presidency in this country.

You are triggering me off into a campaign speech here. I will cease and desist with this and get on with my questioning.

Admiral La Rocque. Let me say I am glad that the citizens of Ohio did send you here, Senator.

Senator Glenn. Thank you.

Admiral La Rocque. I just might add to your comments, Mr. Chairman, concerning commitments. When I was in the Joint Staff 2 years ago, Chairman Max Taylor called me in and two of my colleagues and said, "I wish you fellows would try and figure out how many troops we need to meet our commitments." That meant first of all we wanted to look at all of our treaty commitments around the world, including NATO. We came back in 3 days and we said, "Mr. Chairman, we cannot rationalize one soldier, one airman, one sailor on the basis of any treaty commitments we have made." NATO is handled on an annual basis which was then called the "Annual Review Questionnaire" in which each nation, as you may remember, says this is what we are going to provide to NATO. So it is sort of an annual commitment. But it is whatever the nation in each of the countries decides it is going to submit. But there is not one troop under any of our treaties or executive agreements that can be justified on the basis of written commitments that are public in any event.

Senator GLENN. Scientific advances and technical advances no longer remain in one country. Whether we like it or not, they spread. Nuclear proliferation is going to follow the advancing knowledge of nuclear technology and science around the world. Some of our people have taken the view that the only reason we have as much control over this as we have is the fact that we have been the principal supplier and are able to deal with people and furnish the equipment and the enriched uranium.

So by being a part and parcel of this commercial process, we have literally been able to control what has gone on so far, to a degree, of course. If we drop out of this, if we stop exporting commercial nuclear power, the thought is that France or other nations will fill that gap and might not try to influence as much damp controls for preventing this power being misused for atomic weaponry development.

What are your comments on that?

Admiral LA ROCQUE. I think, Mr. Chairman, we are going to have to look down the road a bit to where every nation in the world has a nuclear reactor. I quite agree with you, there is no way that we can stem the flow of this technology.

If they have nuclear reactors, it is going to be impossible, even for neighboring nations, or even powerful nations to prevent them—the governments of these nations—from taking the plutonium and developing their own explosive device or whatever they call it.

I think we have to accept that. I do not think there is any way that we can prevent it. I would hope that we could exercise some controls through the IAEA. That is the only way I think it can be done and we would have to accept whatever they are.

Senator GLENN. They do not exercise control.

Admiral LA ROCQUE. True.

Senator GLENN. They supply information. I think it is more for information than control.

Admiral LA ROCQUE. I stand corrected. That is a very good point because there is no control. I do not think there can be any control for observation, the monitoring and perhaps the reporting. Disclosure may be of some use, and even there I doubt very much if a nation wanted to do it clandestingly and did not want to give it to the IAEA, that organization would not know about it.

But I just think we have to accept it as one of the hazards of our age. Nuclear power is too important to these developing nations.

Senator GLENN. Do you think the safeguards are effective or do you think they are bad? One of the things this bill deals with, of course, concerns who will conduct the licensing operations and who has the final veto power over it. Should NRC have that, as opposed to ERDA or somebody else? The bill proposes that since NRC has—or should have—the technical capability to assess what is and is not safe and secure, that they should have a veto whether it is licensed, even though the Commerce Department would be the agency issuing the actual licenses for the sale of nuclear energy.

Admiral LA ROCQUE. I think that has to be taken out of Commerce—or not put into Commerce and to be left with some agency that has some expertise in this field. The new split off of the Atomic Energy Commission could do it.

But there are two kinds of safeguard measures, and perhaps many more. There is the safeguard within the country for its own purposes to prevent an unexplained or dramatic explosion of a nuclear powerplant. I think each country is going to have to be very concerned about that themselves. But if it is a danger to them, and we can assume some assistance perhaps and guidelines that they will take whatever precautions are necessary to protect themselves.

The other safeguard, which is much more difficult, is where terrorists or other groups can divert a portion of the plutonium and make their own nuclear weapon.

The third kind, really, is where you have nuclear weapons within a country and they are inadequately safeguarded.

I know our own Defense Department is not happy about our own safeguarding of our own nuclear weapons overseas. Mr. Schlesinger has recently said he is trying to improve it, which means to me he is not happy with it.

Senator GLENN. I think your statement indicates to me that you look upon, and correct me if I am wrong, you look upon the commercial view for nuclear energy as almost being a prelude to their developing their own weaponry if they wanted to.

Admiral LA ROCQUE. Yes, sir; I don't think you can stop a sovereign nation that has a nuclear powerplant from developing its own nuclear device and nuclear weapons.

Senator GLENN. You are probably proposing that we not sell nuclear powerplants to them.

Admiral LA ROCQUE. I think if we do not sell them, as you point out—or as you mention—someone else will. I think these impoverished nations are going to need nuclear energy to improve their standard of living. We are going to have to accept the fact that nations are going to provide their own safeguards.

It gets back to your business that the whole world is getting smaller and we are going to have to work more closely with all of the nations of the world who develop these nuclear powerplants.

Senator GLENN. Admiral, I am going to have to go. There is a vote I must give. I was just about at the end of my questioning. Do you have any other comment you would wish to make, just so long as it does not take more than 3 minutes.

Admiral La Rocque. This will just take 1 minute. I apologize for coming in late this morning. I was giving a talk to the Society of Naval Engineers at a local hotel here this morning.

I would just like to suggest these points as a guideline for any legislation that you decide to do in connection with our sales, that is, that our sales be in consonance with our foreign policy. That our sales and military equipment or weapons not destabilize an area of the world. That there be some provision for congressional oversight. And last, that sales of arms contribute in a positive way to our national defense and not in any way contribute in a negative way to our national defense.

Senator Glenn. Not to be sold strictly for commercial purposes.

Admiral La Rocque. That is correct.

Senator Glenn. We appreciate having you here this morning. I know you have been gathering tremendous amounts of information. We appreciate your expertise.

Admiral La Rocque. Thank you, Mr. Chairman.

Senator Glenn. The hearing is adjourned, subject to call of the chairman.

[Whereupon, at 12:20 p.m. the hearing adjourned, subject to call by the chairman.]

APPENDIX

STATEMENT OF JOHN NELSON WASHBURN, Ph.D., LL.B., SUBMITTED MAY 9, 1975 TO THE COMMITTEE ON GOVERNMENT OPERATIONS UNITED STATES SENATE FOR HEARINGS ON S. 1439 - THE EXPORT REORGANIZATION ACT OF 1975 - CONDUCTED BY SENATOR JOHN GLENN, A COSPONSOR OF S. 1439, IN HIS CAPACITY AS AD HOC CHAIRMAN OF SUCH HEARINGS BEGUN APRIL 24, 1975

MR. CHAIRMAN:

I am John Nelson Washburn, a Washington-based international lawyer, teacher and journalist. During service as an attorney-adviser (international) from 1958 to 1966 in the Office of the Legal Adviser of the Department of State U.S.A. I was involved in monitoring International Atomic Energy Agency matters, including the development, initiation and administration of international safeguards designed to prevent atoms for peace from being diverted to atoms for war. Moreover,I served from October 1958 to March 1959 as a U.S. Delegation advisor at the three-Power(U.K., U.S.A., U.S.S.R.) Conference on the Discontinuance of Nuclear Weapon Tests, which led to the conclusion years later of The Limited Test Ban Treaty.

In view of my long experience (since October 1945 while on army occupation duty at the 38th parallel in Korea) as a Soviet affairs specialist, I have developed "po gor'komu opytu(from bitter experience)" a healthy cycnism about the prospects for international cooperation at the United Nations and elsewhere in this field devoted to the peaceful uses of atomic energy. Accordingly, Mr. Chairman, I find very refreshing your comments of Thursday, April 24, made in the face of the reassuring words from the great experts with lofty status before you:

> "We could coordinate until breakfast, and all of the coordination between agencies does not mean anything, unless we really have a handle on where the plutonium in the world is.
>
> "I do not share your confidence for the moment about IAEA having a good handle on all of this, nor do I have all of the confidence that some of you gentlemen have exhibited with regard to the cooperative efforts of solving our problems."

Regardless of whether you wish to characterize your position quoted above as "rather harsh indictments" or mere criticism, I would respectfully propose that you undertake to widen your circle of witnesses on S. 1439 beyond those you have stated to be "the most experienced people in the world in this area of regulatory control." Why not call, for example, in view of the apparent diversion of plutonium by India, for which the U.S.S.R. is a valuable mentor in nuclear matters, American scientists who have served at the Soviet Union's nuclear center in Dubna or the skilled Department of State Language Services Division Russian interpreter William Krimer who has interpreted for atomic energy delegations in both the U.S.A. and the U.S.S.R.?

If, Mr. Chairman, "We are playing doomsday today here.", as you warned April 24, then you should make every effort to probe much deeper into each troublesome aspect in the growing trend toward covert spreading of nuclear weapons and explosives. This will perhaps be more difficult than it otherwise would be because of the gross over-evaluation of the significance of such international legal instruments as The Limited Test Ban Treaty. As a participant in the most preliminary stage of the drafting of this legal instrument, I can assure you that the definitive text acceptable to the U.K., U.S.A. and the U.S.S.R. in 1963 was tantamount to what the United States Delegation of 1958-1959 considered prospective language for preambular provisions; provisions for on-site inspection teams and posts of inspectors located within the territory of parties to such a legal instrument were absent when The Limited Test Ban Treaty was signed in Moscow with key United States Senators in attendance. Both Democratic and Republican Administrations of the past two decades have used the process of negotiations and the nuclear agreements concluded in a transparent effort to convince the American public and indeed the world that a succession of foreign policy triumphs have been developed. It is high time to eschew such attempts to equate publicity with genuine progress; if we realize that we have made little or no progress, then we shall do much more and better work to reverse the already ominous trend in the spreading of nuclear weapons and explosives.

In conclusion, Mr. Chairman, I respectfully submit that you take comprehensive testimony from Admiral H.G. Rickover, for it may be that in your efforts through S. 1439 to centralize the export licensing and approval function in the Commerce Department, a Federal department renowned for its subservience to the Department of State in matters affecting applications to export to Communist countries in general and to the Soviet Union in particular, you may actually facilitate without genuine safeguards applied by tough-minded officials the export to the U.S.S.R. of strategically sensitive hardware. If you should doubt the possibility of any such occurrence detrimental to U.S. security interests, then read carefully the excerpt below from Vice Admiral H.G. Rickover's March 19,1970 testimony before the JCAE - a sobering TAB#1:

Mr. Chairman, there is now in the files of the U.S. Senate Committee on Foreign Relations detailed testimony submitted on the occasion of the nomination of Elliot L. Richardson to be United States Ambassador to the United Kingdom which specifically identifies him as the individual responsible for conducting these 1969-1970 State Department efforts to give away Polaris submarine technology in his capacity as Under Secretary of State.

Excerpt from hearings before the Joint Committee on Atomic Energy Congress of the United States Ninety-first Congress, Second Session, on Naval Nuclear Propulsion Program, March 19, 1970, Testimony of Vice Admiral H. G. Rickover, pp. 2-101 at pp.9-15 follows:

STATE DEPARTMENT DESIRES TO GIVE NUCLEAR PROPULSION TECHNOLOGY AWAY

Admiral RICKOVER. Senator Aiken, despite all of this there is currently significant pressure from the State Department to give our nuclear propulsion technology away. The only thing that deters them is the knowledge of where this committee and Congress stands. I tell you this, and I tell it as strongly as I can.

Senator AIKEN. I am asking this question because I am also a member of the Foreign Relations Committee, and I intend to find out more about this as far as the State Department is concerned because I feel we should not sell our nuclear submarines to other countries, some perhaps who have very little experience with them anyway. Undoubtedly there would be some knowledge transmitted to these other countries. Once that is done, away it goes. The Russians have undoubtedly gotten a great deal of information already in different ways from us.

I am also concerned lest our nuclear endeavors be used as a diplomatic ploy; a trade to get some imagined concessions from other countries, and this applies particularly to Russia. Then we had a consortium. We have had this testimony before this committee so there is no need of going over it again.

I simply have to say that I don't approve of such a sale. If we lead the world in one respect it is probably in the naval nuclear submarines and naval nuclear surface ships today. I think we ought to retain that advantage and not through an entity of government run the risk of losing it.

Representative ANDERSON. Will the Senator yield?

It seems to me the point you are making this afternoon is particularly valid in view of reports—and this is in the classified domain, I believe—about the possibility that land based missiles may some day be obsolete and that we might have to go back to relying largely on underwater nuclear deterrence as the one thing that would be still credible.

Senator AIKEN. The slogan of the Defense Department used to be that if it works, it is obsolete, but certainly not a slogan to the effect it is obsolete before it is started. It is usually at least finished.

That is all I have to say. I merely wanted to express my concern, and I shall take it up with the State Department.

SENATOR CLINTON P. ANDERSON'S STATEMENT

Chairman HOLIFIELD. Senator Aiken, I think you are on the right track, and I hadn't intended to read this. It is a statement by Senator Anderson. He was called out of the city and asked that it be included in the record. However, it might be well if I were to read it.

(Reading) "For at least the past 10 years this committee has had to fend off repeated attempts by the State Department and sometimes the Defense Department to give away our nuclear propulsion information. In all of these cases I cannot recall one single instance, had this committee gone along, where the United States would have benefited. In fact, had we done what was proposed 10 years ago to share our technology with all our European friends, there is no question in my mind that our Polaris weapon system would be completely ineffective today.

"There is no precedent or law which requires one nation to share all of its military secrets with its allies. Why this concept is so difficult for people in the State Department to understand is beyond me. I would think that a rudimentary knowledge of history would make this perfectly clear. Recognizing that maintaining military secrets in a free society such as ours is so much more difficult than in a police state, we should not go out of our way to give the information away or to use this information to buy friendship. History should have taught us by now that you do not 'buy' friendship from your allies especially when the price is your own security.

"We are often told that if we don't help country 'A' by giving them information or material, they will go and seek it from country 'B'. The State Department tells us this is bad, and we should not let it happen. I disagree. As far as I am concerned, it is about time those countries stopped depending on the United States. If they are going to use that argument as a threat, we should tell them to go ahead.

"I suspect that in most of these cases, representatives of our own Government have enticed the foreign governments into asking for these secrets in the expectation that they will receive a favorable response. This makes the U.S. representative look good in the eyes of the foreign government. The U.S. representative thinks he is doing a good job because 'his' foreign government is happy. Then when Congress will not approve the give-away, the U.S. representative just shrugs his shoulders and blames Congress. Sometimes I wonder if our Government representatives in foreign countries understand what their job really is.

"Of course there is another aspect, which is just as bad. I am sure there are many private companies in the United States that would be delighted if this country took on the role of providing the entire world with everything—especially their own product. If we agreed to supply 20 polaris submarines to some foreign government, there are many U.S. companies that would stand off in the wings and cheer. In fact, I expect many foreign governments are encouraged along these lines through devious channels into the foreign governments and our own."

CONGRESS OPPOSED TO GIVING U.S. TECHNOLOGY AWAY

"It is fortunate the Atomic Energy Act has provisions to keep this from happening. I would like to assure the State Department that I, this committee, and the Congress are opposed to giving away this information which is so vital to our protection. It is time the Secretary of State stopped the 'do-gooders' in his Department from being more concerned with their client countries than they are with the security of the United States." [End of reading.]

This fit in so closely with what you had just said that I felt I should read it. Senator Anderson, as you know, is the chairman of our Subcommittee on Security.

As long as we are on this subject, I have a question for you, Admiral. Last June, the committee was advised by the State Department that [classified matter deleted]. The State Department assured us that they would continue to be in close touch with the committee on this subject; however, we have heard nothing further from them on this matter.

Will you tell us what has transpired and where the matter stands? It has never been clear to me who it is within our Government that is behind these recurrent campaigns to give away our Polaris submarine technology.

Admiral RICKOVER. I will do my best, sir; this is a very involved subject. If I may, I will begin with the last part of your question; that is, who is responsible? In this case, the answer is quite clear: it is the Department of State, and no one else. Each time the matter has been raised, the other agencies involved [classified matter deleted] have unanimously recommended against sharing this technology [classified matter deleted] allies. Only the State Department has kept the matter alive.

ADMIRAL RICKOVER'S "LITTLE PLAYTHING"

As the committee is aware from the numerous previous hearings on this subject, the State Department has very little appreciation for the value of our Polaris submarine propulsion technology and its strategic implications. They have been trying to give it away for years. In this connection, there is much significance in a remark made recently by a State Department official to a Defense Department representative; he referred sarcastically to our naval nuclear propulsion technology as "Admiral Rickover's little plaything." This is a very revealing statement. It implies, first, that the technology in question is trivial, to the point of childishness; and, second, that I am the only person trying to protect it.

I must say that, in a period when nuclear-powered submarines play the principal role in our strategic deterrent, the security of this technology somehow does not strike me as being trivial or childish. I would also note—contrary to the impression the State Department official was trying to convey—it is not I alone who feel we must continue to protect this technology, but rather the State Department alone which persists in the opposite view. The [classified matter deleted] are wholly in agreement with my views on this matter, and this committee's position, which is also opposed to further dissemination of this sensitive technology abroad, is well known.

The idea that I could marshal this level and magnitude of responsible support for a childish whim, sir, is manifestly absurd. If I actually possessed that sort of influence, I assure you the world would be a different place. So would the State Department.

I believe this committee is well aware that the only "plaything" I have or have ever had is the security and well-being of the United States; I am thankful the members of the committee and the Congress regard these interests as their "plaything" as well.

STRONG EXECUTIVE BRANCH OPPOSITION TO FOREIGN ASSISTANCE

With respect to the first part of your question, sir, what has transpired has been a classic case of bureaucratic procrastination and maneuvering. Since last June there have been a long series of meetings, letters, and interagency memorandums on how we should handle [classified matter deleted] request. At each point of discussion, all the cognizant agencies except the State Department have agreed that we could arrange general, nontechnical discussions with [classified matter deleted] on the financial implications and training requirements of a naval nuclear propulsion program. They agreed unanimously, however, that it would not be in the national interest to enter into a cooperative arrangement [classified matter deleted] in this field, or to disclose U.S. naval nuclear propulsion information [classified matter deleted] allies. Their reasons for this position are as follows:

U.S. ASSISTANCE ENTAILS GREAT RISKS, LITTLE ADVANTAGE

First, assistance to additional governments would substantially increase the risk that highly sensitive technology, not otherwise available to the Soviets, would be compromised; and would create an unacceptable burden on the U.S. naval reactors program. The net effect of these factors would be a serious dissipation of the U.S. strategic advantage over the Soviet Union in this critical area.

Second, this risk cannot be justified on military grounds. The limited numbers of nuclear-powered submarines our allies could produce and maintain, even with U.S. assistance, would be negligible as compared to the U.S. and Soviet forces.

Finally, it would be inefficient and wasteful to establish in these smaller countries the huge technical and industrial base required to build or maintain nuclear-powered submarines, when the United States has a far superior base already established. To diffuse U.S. resources among these lesser powers would weaken, rather than strengthen, the net allied capability in this field.

STATE DEPARTMENT PROPOSES "GIMMICKY" ARRANGEMENTS

The State Department has not concurred in these views. Instead, they have repeatedly clouded the issue by proposing additional studies of various "gimmicky" arrangements, such as the sale of older class, U.S. nuclear-powered attack submarines (for example, *Triton*) to certain allies. This, I believe, must be what Senator Aiken was referring to a few minutes ago—the proposed sale of used propulsion plants.

They have also suggested assistance to a consortium of European NATO allies in the development of nuclear-powered attack submarines with costs borne by the Europeans, or giving U.S. consent to permit the United Kingdom to cooperate with "a few other key NATO allies," by disclosing to them technology obtained from the United States.

As the committee will recognize, these proposals are simply circuitous ways of disclosing the same sensitive technology the rest of us have been trying so hard to protect. All of these alternatives have been given due consideration by the responsible technical, military, and intelligence authorities and found to be unacceptable on the same grounds as direct U.S. assistance. We have repeatedly tried to explain to the State Department some of the technical realities of building, operating, and maintaining these complex nuclear reactors, particularly why we cannot simply sell [classified matter deleted] an old submarine and have them drive off in it like a used car, or why the construction of a U.S.-designed nuclear-powered submarine by a novice government in this field would require massive technical assistance from the United States and divert critically needed resources from our own program. But they are bent on seeing this whole matter as "Rickover's plaything"; thus, the State Department keeps raising these phony proposals to keep the issue alive and our allies in a state of suspended animation.

As late as January 23, of this year, the State Department advised the Department of Defense, with respect to assisting [classified matter deleted] in nuclear submarine propulsion, that—

> The Department of State has never taken the position that there should be additional agreements. We do not yet have a position on this subject. But we do believe that there have been sufficient new developments in this field that all relevant factors—political, military, intelligence, technological—should be studied before we decide on a course of action.

This statement is misleading in two respects. First, as every member of this committee knows, the State Department has for years been in favor of disseminating our Polaris submarine propulsion technology abroad, largely as a means of ingratiating the United States with its allies. If they were not in favor of additional agreements, their constant maneuvering and delays in the face of unanimous opposition by all the other agencies concerned would simply be incomprehensible. To say, in these circumstances, that the State Department does "not yet have a position" is sophistry, at best.

Second, this is but one of numerous references the State Department has made in recent months to "new developments" which have not been considered. But they never say what these new developments are, or how the State Department gained access to new information not available to the Defense Department [classified matter deleted]. Apparently, it is so secret that they cannot reveal it even to the other executive agencies.

This is where the matter stands today, sir, as far as I know. I regret I cannot give you a more precise answer, but the picture is very vague and muddy. At this point I would hesitate to predict what direction it might take next.

NO EXPLANATION FOR STATE DEPARTMENT POSITION

Chairman **Holifield**. What is the basis for the State Department position?

Admiral **Rickover**. They do not tell us, Mr. Chairman. They published a paper on this subject, entitled "Views of the Department of State," in which they state a number of unsupported conclusions contrary to those of the responsible agencies. They state, for example, that assisting European allies to establish naval nuclear propulsion programs would cause "no sudden, serious strain on U.S. personnel resources." I am responsible for the U.S. program, and I have repeatedly stated that our program could not stand the load of another assistance program. This committee is well aware of the difficulties we are having keeping the resources, both personnel and industrial, we need to compete with the Russians in this field. And you can easily see what a massive burden it would place on our own people to have to duplicate this entire technical and industrial program, starting from scratch, in a totally inexperienced country. It staggers the mind. Yet, the State Department blandly says it would cause no strain. They were going to send that paper to the President.

Chairman Holifield. Is it possible they do have information they are not telling you about?

Admiral Rickover. I do not know, sir. Here is another item. The committee is also aware of how [classified matter deleted] and how closely we need to guard our own technology to protect the narrow technological lead we still have. Any major compromise at this point could easily give them a decisive advantage over us. [Classified matter deleted.] Yet, the State Department paper concluded that "The significant advances made by the Soviet Union in developing and deploying high-speed nuclear submarines have substantially reduced the weight of the security element as a factor in considering this issue." In other words, it is their expert assessment that it is all right now to give away our secrets.

Chairman Holifield. Can you supply a copy of the State Department paper for the record?

Admiral Rickover. I am sorry, sir. As you know, I am not authorized to release a document issued by another agency. I am sure, however, that the State Department will be happy to apprise the committee of their views. I would also note that they are committed to inform the committee of any new developments in this matter, and they now want to advise the President there have been sufficient new developments to warrant a restudy of our entire position in this field. I assume they will want you to know of these important new developments. I hope that when you find out what they are you will tell the Defense Department and the [classified matter deleted].

Representative Hosmer. Did you have any success in [classified matter deleted].

Admiral Rickover. No, sir. [Classified matter deleted.]

EXPORT OF ADVANCED U.S. COMPUTERS

Chairman Holifield. We had a case recently where advances were made for our best computer. What is that number?

Mr. Murphy. The CDC 6600.

Admiral Rickover. I believe you are referring to the attempt by the Soviets to obtain a CDC 6600 computer for their accelerator at Serpukhov. You should realize that the AEC helped pay for the development of that computer from the money Congress appropriated.

Chairman Holifield. The Soviets have been doing everything under the sun to get the AEC, through the State Department, to make some kind of deal whereby they could buy this. They said, "We just want to use it. You can put a padlock on it, and we won't steal the technology or anything like that." You should know what that would amount to.

Admiral Rickover. Back in September of 1969, the AEC asked for my comments on a study they were doing of the pros and cons of placing a CDC 6600 computer at Serpukhov. I made my views known in a memorandum dated September 10, 1969,[1] in which I pointed out that the study underestimated the risks and did not address several important considerations. From my review of the issues, I concluded that it was not in our national interest to permit Soviet purchase of our high-speed, high-performance computers with or without controls. Of course, the United States has already sold CDC 6600's to the French and a number of other countries.

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[1] Memo is classified and is on file with the Joint Committee.

[Classified matter deleted.]

Chairman HOLIFIELD. When did these go?

Mr. GREER. It was in 1967 that the French bought their first 6600 and there are now seven of these units that Control Data Corp. has sold to the French. The last meeting on the operation of this machine was held in Zurich, Switzerland.

Chairman HOLIFIELD. Did the AEC attend?

Mr. GREER. A limited number of AEC contractors attended.

Chairman HOLIFIELD. Are we talking about the same machine? That is not the latest machine.

Mr. GREER. The CDC 6600 is the current production model. The CDC 7600 machine is just coming on the market. AEC laboratories are just obtaining delivery on the 7600; [classified matter deleted].

HOW GOVERNMENT HANDLES COMPUTER EXPORT

Senator AIKEN. May I ask who handles these transactions for the State Department? I am not satisfied that the top echelon knows what the lower echelon may be doing.

Admiral RICKOVER. I will get the answers to Mr. Holifield's question and to your question. (See p. 18.)

Chairman HOLIFIELD. Isn't it true that there are two later models than the 6600?

Mr. GREER. There is a standard CDC 6600 machine, and then there is what we call a dual CDC 6600 machine which is tying two of the 6600's together. There is a later CDC computer model [Classified matter deleted]. That is the 7600 machine. In addition, IBM has an advanced computer with capabilities similar to the CDC 7600 called the model 195.

When the United States agreed to sell a CDC 6600 to the French, it was the biggest, most powerful computer of its time.

Senator AIKEN. To France?

Mr. GREER. To France among others; yes, sir.

Representative HOSMER. In connection with the Serpukhov accelerator, it is the 6600 that the Soviets spoke to our scientists about repeatedly. That is the one they had in mind.

Mr. GREER. Yes, sir. The 6600 machine is the model which the Soviets stated they would like to have. It still is one of the most powerful computers in the world.

FOREIGN SALES BY CONTROL DATA CORP.

Senator AIKEN. Has just one been delivered to France? What about other countries?

Admiral RICKOVER. Seven have, Senator Aiken. Also one has gone to the CERN in Switzerland which I am sure you know is open to the Soviets. I do not know what other countries have received them but I am sure I can obtain it.

Chairman HOLIFIELD. Please do that.

THE DEFENSE
MONITOR

CENTER FOR DEFENSE INFORMATION — WASHINGTON, D.C.

Volume Four Number Three

May, 1975

U.S. Arms to the Persian Gulf: $10 Billion Since 1973

U.S. political and military involvement in the Persian Gulf has been expanding rapidly in recent years. The leading edge of our involvement in this area — as it was in Southeast Asia in the 1950's and 1960's — is military assistance and arms sales.

The U.S. is not the only supplier of arms to the Persian Gulf, but it is by far the largest. In 1974 the U.S. sold over $4.4 Billion worth of arms to Persian Gulf countries. Russia sold $1.5 Billion, France sold $1.5 Billion and Britain sold $50 million. Saudi Arabia and Iran have been the chief customers for U.S. arms. In 1974, these two countries alone bought $4.4 Billion worth of American weapons. Recently Iran and the U.S. announced a $15 Billion five-year trade deal, that is expected to include the delivery of $5 Billion worth of U.S. arms. U.S. arms are helping to make Iran a major world military power.

The major countries of the region are now spending about $5.8 Billion a year on their military forces. Just five years ago the total was $1.6 Billion. Kuwait and Saudi Arabia are among the leading countries of the Middle East and the world in per capita military expenditures, ranking second and third in the Middle East and thirteenth and nineteenth respectively in the world.

One justification U.S. officials give for arming Iran has been to make direct U.S. involvement in the area unnecessary. There are indications, however, that Pentagon officials have decided that a U.S. presence in the area is necessary in any case. The Navy has begun regular deployment of a carrier task force to the Indian Ocean and visits to the Persian Gulf. At the same time, the U.S. is in the process of developing a base at Diego Garcia and there are plans to use the former British base at Masirah and perhaps the base at Gan. In addition, the U.S. Middle East Force has a base at Bahrain. All of this points to growing U.S. involvement in a highly volatile region of the world.

Changing Sales Patterns

The character of U.S. military assistance and arms transfers has undergone major changes in recent years. In the past it was unusual for the U.S. or any other country to provide or sell its most advanced weapons to foreign governments. With the possible exception of some favored allies, foreign recipients of military aid had to content themselves with older or obsolescent equipment. For example, in the early 1960's, Saudi Arabia's air force consisted of obsolete U.S. B-26's, British Vampires and some Korean war vintage F-86's.

MONITOR IN BRIEF

- U.S. political and military involvement in the Persian Gulf is growing rapidly, but there is no coherent U.S. foreign policy for the area. While peace in the Persian Gulf is obviously in the U.S. interest, U.S. military aid programs and massive arms sales increase tensions in the region and increase the likelihood of war.
- Since 1973, the U.S. has sold $10 Billion worth of arms to Persian Gulf countries, making it the leading supplier of arms to that part of the world. The U.S. is also acquiring new military bases in the area.
- In contrast to past practices, the U.S. and other countries are arming Persian Gulf countries with the most advanced offensive weapons. This will raise the level of destructiveness of future wars.
- Iran is becoming a major military power, largely as a result of arms purchased from the U.S. — $7.8 Billion since 1973. Soon Iran's power will be felt in areas outside the Persian Gulf.
- Any short-range financial benefits to the U.S. from the sale of arms to the Persian Gulf are outweighed by long-range political and military costs. Restraints on weapons sales by all countries to the region, on both amounts and kinds, are needed if peace and stability are to be preserved.

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This pattern has changed quite radically in recent years, particularly in the Middle East and Persian Gulf, where oil-rich governments can afford to pay for the most up-to-date equipment. Beginning in the mid-1960's Iran began acquiring the F-4 Phantom which was, and still is, one of the first-line fighter aircraft of the U.S. Air Force. Iran is now about to buy sophisticated and expensive F-14 fighters from the U.S. It is scheduled to get these aircraft in 1976, only 21 months after the first F-14's are placed in the U.S. Navy's inventory. Iran will be adding ocean-going DD-963 destroyers to its Navy soon after the last of these destroyers are introduced into the U.S. Navy. It will soon receive improved Hawk surface-to-air missiles and has already received TOW anti-tank missiles, both currently being added to the U.S. inventory. From Britain, Iran has purchased Chieftain tanks, which are the first-line tank of the British Army. Kuwait has announced plans to purchase the Mirage F-1 aircraft from France, and will begin adding it to its inventory at the same time France acquires the Mirage in large numbers for its own Air Force. The fundamental point is that the sophistication of the weapons available to the countries of the Persian Gulf has escalated substantially in recent years and a full-scale war in the region is likely to prove highly destructive and very costly.

Growing Potential for Destruction

This infusion of advanced military technology has greatly increased the offensive military capabilities of several Persian Gulf countries — Iran in particular. The countries in the region are acquiring the capability to make war at ever-increasing levels of potential destructiveness. Neighbors who previously did not have the means to threaten each other are now becoming capable of waging full-scale wars. Such conflicts could lead to U.S. involvement. We must also ask whether the U.S. may also be creating military powers that some day will turn against us.

A.C.D.A. SEES DANGERS

"In some cases the flow of weapons to an already tense region can further aggravate the situation by raising doubts about the recipient's intentions, particularly when the transfers involve a marked acceleration of a recipient's rate of acquisitions or a sudden shift to a more advanced weapon system. In such a climate of heightened distrust, the chances of miscalculation and precipitate military action may increase."

U.S. Arms Control and Disarmament Agency, Report to the Congress, 1973

Many of these advanced long-range weapons, such as the F-4, F-14, and DD-963 destroyers, supplied or about to be supplied to Iran, have strategic implications beyond the Persian Gulf. The Iranian military build-up and Iranian aid to Pakistan (Iran has given 90 F-86 jets and several modern C-130 transports to Pakistan) could in the future be seen as a threat by India. At present Iranian-Indian relations are cordial but a continued Iranian build-up and more Iranian aid to Pakistan could turn the relations between these two countries sour over the next few years. In similar fashion Saudi and Kuwaiti arms may soon have an impact on the Arab-Israeli military balance. As Saudi Arabia and Kuwait grow in power the Israelis may have to begin to weigh them in the total balance. This may make the Israelis less secure and undermine a key tenet of U.S. policy which is to insure the survival of Israel. It may also increase Israel's need for military assistance and cost the U.S. money in the long run.

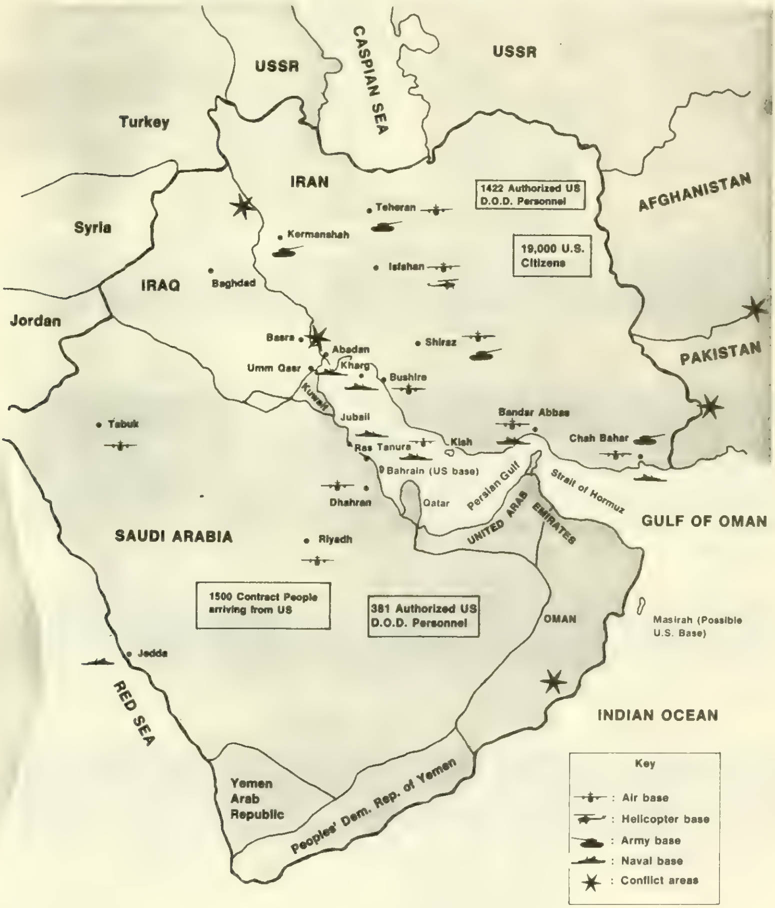
U.S. Foreign Military Sales To The Persian Gulf

(Thousands of Dollars)

	1950-1969	1970	1971	1972	1973	1974	1975*	TOTAL
Iran	$647,497	$113,284	$396,613	$528,022	$2,108,787	$3,794,369	$1,935,242	$ 9,523,816
Iraq	$ 13,152							$ 13,152
Kuwait					$ 53	$ 18,154	$ 331,671	$ 349,878
Oman							$ 1,613	$ 1,613
Saudi Arabia	$161,468	$ 14,854	$ 95,815	$342,295	$ 83,984	$ 587,698	$1,101,774	$ 2,387,887
Total	$822,117	$128,138	$492,428	$870,317	$2,192,824	$4,400,221	$3,370,330	$12,276,346

*First Nine Months of fiscal year

The Persian Gulf Tinderbox



Disputes Make Gulf a Volatile Area

The Persian Gulf is a highly volatile area. Numerous disputes among countries in the region make it an area of great instability. As Senator Kennedy has pointed out, "Passions are deep and distances are short."

The two largest purchasers of U.S. weapons in the Persian Gulf area — Iran and Saudi Arabia — are traditional rivals. At the root of their rivalry are a number of long standing differences. Both are strongly nationalistic and disagree over whether the Gulf that separates them is the Persian Gulf or the Arabian Gulf. Saudis are Arab and Iranians are Aryan. They are divided by religious differences — Iranians are Shia Muslims and Saudis are Sunni Muslims. Saudi Arabia has been a strong opponent of Israel and a supporter of Israel's Arab enemies, while Iran has quietly supported Israel and continued to sell oil to Israel. Finally, and most important of all, the Shah's ambitions to be the dominant power in the Gulf clash with Saudi aspirations and undoubtedly make the Saudis uneasy about their own security. Despite the avowed intention of the U.S., sales of arms to Iran can only serve to further increase tensions and reduce the chances of peaceful cooperation. Arming one power leads in turn to increased demands for arms by the other. Such a policy may stimulate business for U.S. arms manufacturers, but it could lead to war.

The continuing dispute between Iran and Saudi Arabia is the most prominent among the Persian Gulf countries, but it is by no means the only one.

Conflicts in the Persian Gulf Region

OPPONENTS	SOURCES OF CONFLICT	STATUS
Iran and Iraq	**Boundary dispute.**	**Agreement signed in March 1975 may temporarily resolve conflict.**
Iran and Iraq	Iranian support for Kurdish rebels fighting for autonomy from Iraq.	Iran has agreed to cease support in return for settlement of river boundary.
Iran, Saudi Arabia, Iraq, Kuwait, UAE, Oman	**Domination of Persian Gulf—Iran has treated Gulf as own lake — has seized islands of Abu Musa and Tunbs — Iraq, Saudi Arabia and Kuwait resent Iranian domination of Gulf. Conflict also embedded in ancient antagonisms between Iran and the Arabs.**	**Unresolved — source of tension.**
Iraq, Kuwait, Saudi Arabia	Iraq claim to Kuwaiti territory to insure access to harbor at Umm Qasr. Saudis back Kuwait.	Temporarily resolved— Iraq has withdrawn claim to Kuwaiti land.
Oman and Dhofar Rebels, Peoples Republic of Yemen	**Rebels in Dhofar province of Oman are fighting for independence — Oman government supported by U.K., Iran, Jordan, and U.S.**	**Rebellion is in continuing state of ferment.**
Afghanistan and Pakistan	Afghanistan has supported aspirations of Pashtu tribes for independence from Pakistan. Iran has supported Pakistan.	Unresolved — in state of ferment.
Pakistan and Baluchi Rebels	**Baluchi tribesmen seek independence from Pakistan — Pakistan trying to keep remainder of territory intact — Iran has provided military assistance to Pakistan.**	**Unresolved — in state of ferment.**
India and Pakistan	Long history of Indian & Pakistani hostility — 3 wars in past 30 years — most recent in 1971. Iran opposes further dismemberment of Pakistan and has expressed support for Pakistan.	Unresolved — source of tension.

Arms Transfers to Major Persian Gulf Countries 1970 - 1975

(Millions of Dollars)

IRAN

Weapon	Supplier	Year Ordered	Cost	No of Weapons
Fighter-Bombers			**Cost $2716.6**	**No 359**
Phantom II (F-4)	USA	1971 72 74	$581.6 M	138
Tiger II (F-5E)	USA	1972	$285.0 M	141
Tomcat/ Phoenix (F 14)	USA	1974	$1850.0 M	80
Transport Planes			**Cost $412.03**	**No. 125**
Hercules (C-130)	USA	1970 72	$203.30 M	50
Fokker (F-27)	Neth	1971 73 74	$30.93 M	20
Bonanza (F-33 690)	USA	1972	$1.60 M	30
Aero-Commander	USA	1972	$2.50 M	3
Boeing (707)	USA	1972	$62.50 M	6
Aero-Shrike	USA	1973	$5.00 M	6
Fokker (F-28)	Neth	1973	$7.20 M	4
Boeing (C-747)	USA	1975	$99.00 M	6
Missiles			**Cost $911.6**	**No. 10,814**
Antitank (SS-11-12)	France	1970	$4.65 M	(1000)
Antitank (TOW)	USA	1972	$15.0 M	2880
Surface to Air (Rapier)	UK	1970	$113.0 M	(241)
Surface to Air (Seacat)	UK	1971	$2.5 M	12
Surface to Air (Hawk)	USA	1972	$100 M	(240)
Air to Air (Sidewinder)	USA	1971 72, 74	$78.7	(3462)
Air to Air (Sparrow)	USA	1971 72 74	$521.7	(2616)
Surface to Surface (Sea Killer)	Italy	1971	$1.8 M	(60)
Surface to Surface (Exocet)	France	1974	$4.27 M	(142)
Torpedo (MK 46) *Launchers	USA	1975	$70.0 M	414
Helicopters			**Cost $1007.5**	**No. 709**
Other Aircraft			**Cost $111.0**	**No. 22**
Fwd Air Control (0-2)	USA	1970	$1.0 M	12
Reconnaissance (RF-4)	USA	1971	$20.0 M	4
Anti-Sub War (P-3 Orion)	USA	1972	$90.0 M	6
Tanks			**Cost $418**	**No 1500**
Med Tank (Chieftain)	UK	1971	$346 M	800
Lt Tank (Scorpion)	UK	1972	$41 M	400
Armored Car	UK	1972	$31 M	300
Other Equipment			**Cost $76.4**	**No. 475**
Blindfire Radar	UK	1973	$14.4 M	unknown
Artillery (175 mm 155mm all self-propelled)	USA	1973	$12 M	75
Arm personnel Carrier (BMP-76)	USSR	1974		
Self Propelled Anti Air Gun (ZSU 23/4)	USSR	1974	($25 M - 50 M)	(200-400)
Artillery	USSR	1974		
Ships			**Cost $871.62 M**	**No 43**
Patrol Boats	USA	1970	$2.1 M	3
Hovercraft	UK	1970 71 73	$32.62 M	10
Frigate (Saam)	UK	1971	$32.0 M	4
Store Repair Ships	UK, USA	1971 73	$18.0 M	3
Destroyer (Sumner)	USA	1972	$ 7 M	3
Fast Patrol Boat (Combattante)	France	1974	$57.6 M	12
Patrol Boat	Germany	1974	$2.1 M	3
Destroyer (Spruance)	USA	1975	$726.5 M	6

SAUDI ARABIA

Weapon	Supplier	Year Ordered	Cost	No of Weapons
Fighter-Bombers			**Cost $1349.5**	**No. 208**
Tiger I (F-5A)	USA	1971	$130.0 M	50
BAC-167	UK	1972	$4.5 M	10
Tiger II (F-5E)	USA	1973-75	$1095.0 M	90
Tiger I (F 5B)	USA	1973		20
Mirage III	France	1973	$120.0 M	38
Transports			**Cost $60.2**	**No. 10**
Hercules (C-130)	USA	1970	$60.0 M	6
Cessna	USA	1970	$.2 M	4
Helicopters			**Cost $20.0**	**No. 36**
Alouette III	French	1970	$1.4 M	6
Missiles			**Cost $296.3**	**No 1848**
Air to Air (Sidewinder)	USA	1971 73, 74	$21.8 M	(960)
Anti-Tank (Vigilant)	UK	1971	$1.4 M	300
Air to Air (Matra)	France	1973	$3.1 M	(228)
Surface to Air (Hawk)	USA	1973	$270 M	(300)
Surface to Air** (Crotale)	France	1974	**	unknown

**Part of package which also included 250 Armored Personnel Carriers (AMX-10) and 200 AMX-30 Tanks

Weapon	Supplier	Year Ordered	Cost	No of Weapons
Tanks			**Cost $816.8**	**No. 430**
Med Tank (AMX 30)	France	1972 74	$800 M **	230
Lt Tank (Scorpion)	UK	1973	$16.8 M	100-200
Arm Car (Fox)	UK	1973		
Other Equipment			**Cost $960+**	**No. 950**
Artillery	USA	1974	$335 M	300-400
Arm Personnel Carriers (M-113)	USA	1974		
Arm Personnel ** Carriers (AMX-10)	France	1974		250
Spare Parts	UK	1972	$625 M	

**Cost of Package which included Crotale Air to Air Missiles and AMX-30 Tanks and AMX-10 Armored Personnel Carriers

Weapon	Supplier	Year Ordered	Cost	No of Weapons
Ships			**Cost $870.8**	**No. 59**
Patrol Boat	UK	1970 71	$21.7 M	31
Hovercraft	UK	1971	$26.1 M	8
Destroyer Escorts - Patrol Boats	USA	1974	$823.0 M	20

(Numbers in parentheses are estimates.)

Since 1970 Persian Gulf countries have ordered more than 1800 aircraft, 4000 tanks and land weapons, 15,000 missiles and 100 ships.

Arms sales data for Iraq, Kuwait, Qatar, Bahrain, Oman and United Arab Emirates are available from the Center. These are excluded from the above list due to lack of space.

The Iranian Connection: New Dangers

With American assistance Iran has become the dominant military power in the Persian Gulf. Iranian military forces are twice as large as those of Iraq and five times larger than those of Saudi Arabia. Iran spends on its military forces four times what Iraq spends and twice what Saudi Arabia spends. This expansion of Iranian military power poses significant risks, both for the U.S. and for other Persian Gulf states. A few years ago the late Senator Richard Russell, commenting on US military capabilities, pointed out that "If Americans find it easy to go anywhere and do anything, they will always be going somewhere and doing something." The same can be said of Iran. If we make it easy for Iranians "to go anywhere and do anything," they will "always be going somewhere and doing something." By massively expanding Iranian military capabilities the U.S. may be encouraging Iranian ambitions to dominate the Persian Gulf. Even if the present regime remains in power there are dangers in this policy.

As the Soviet-Iranian detente has moved forward, the deployment of Iranian military forces has been altered to reflect the new international situation and Iranian ambitions. In the late 1960's, Iranian army units were moved from the northern border area to south of Teheran. The Iranian Navy moved its headquarters to Shiraz in the South. Three-fourths of the F-14's that Iran has ordered from the U.S. will be based in the central and southern part of the country. This pattern indicates that Iran is much more concerned with dominating the politics of the Gulf than it is with the Soviet threat.

New Iranian Bases

Consistent with its new concern with dominating the Persian Gulf, Iran has built several new military bases in the southern part of the country. New bases have been built at Kharg Island, Tunbs Island and Abu Musa. A new base is also being built at Chah Bahar near the Straits of Hormuz on the Indian Ocean, while facilities are being modernized and expanded at Bandar Abbas and Bushire. The continued growth of Iranian military power and its southward deployment will make many of the smaller countries of the Persian Gulf increasingly insecure.

In justifying U.S. arms sales to Iran, U.S. officials have recently emphasized the shared interest between the U.S. and Iran in safeguarding the flow of oil from the Persian Gulf to the U.S., Europe and Japan. The Shah has insisted that he will not participate in another embargo under any circumstances. While there is no reason to doubt the Shah's commitment to this goal — especially given the very high prices he is now getting for his oil — there are some potential dangers. One possibility is that the Shah's ambitions and Iran's growing military power might lead to conflicts in the Persian Gulf area that would disrupt the flow of oil — or might even end with the Shah in control of *all* Persian Gulf oil. The U.S. policy of virtually unlimited arms sales to Iran increases this danger.

Military Forces and Instability

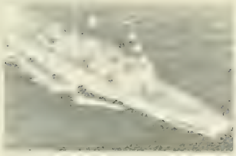
The backward and oppressive governments in power in the Persian Gulf — seven of the eight are monarchies and the other one is a military dictatorship — are constantly faced with the threat of domestic unrest, coups and rebellion. It is worth remembering that Saudi Arabia abolished slavery as recently as 1964. Iran maintains domestic tranquility by means of a powerful and pervasive secret police organization. The recent assassination of King Faisal is rather typical of the kinds of threats that Persian Gulf governments face, especially the conservative monarchies. Iraq, Iran and Saudi Arabia have all experienced coups, attempted coups or assassinations in recent years. Thus, while military forces are created to enhance political stability, in developing countries they often produce just the opposite. In sum, political and social change is inevitable in the Persian Gulf, and U.S. programs that create excessive military establishments can actually stimulate political upheavals.

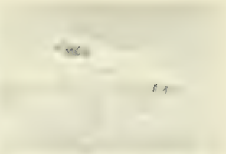
A second result of creating new and powerful military forces in Persian Gulf countries is that once military establishments become powerful domestic political forces their appetites for weapons grow. They come to absorb larger and larger quantities of resources and aspire to newer and more expensive weapons. Indeed, once they have their appetites whetted for sophisticated modern weapons, we can expect the political and military leaders of the Persian Gulf countries to begin to think about acquiring nuclear weapons — especially in light of the recent Indian nuclear explosion. Iran has already indicated that planning is underway to build nuclear air-raid shelters.

The Rapid Growth Of Iranian Military Might

	1965	1975	1985*
Defense Spending	**$217 Million**	**$4 to 5 Billion***	**$10 to 20 Billion**
Aircraft	90	500	2000
Ships	32	41	90
Tanks	500	1260	2460

***Projected**





Intervention For Oil?

Military Obstacles to Intervention

CENTER CONCLUSIONS

1. There should be a U.S. moratorium on arms transfers to Persian Gulf countries. This would provide a period in which the Congress, the Executive branch, and the American people could carefully reassess American policy toward this volatile region of the world. Today the U.S. seems to have no policy except unrestrained arms sales.

2. The U.S. should convene a conference of arms suppliers to attempt to establish controls on the kinds and amounts of weapons introduced into the Persian Gulf. No serious effort along these lines has yet been made.

3. The U.S. should sell no offensive weapons to the Persian Gulf. The sale of weapons with long-range offensive capabilities, such as bombers, sophisticated fighter bombers, refueling planes and large warships, does not serve U.S. interests. The British have set a precedent by refusing to sell offensive weapons to Libya.

4. The Executive branch should be required to submit regular reports to the Congress assessing the military and political impact of the introduction of particular weapons into the Persian Gulf in clear, comprehensive terms.

5. Congress should set an annual ceiling on arms sales to the Persian Gulf area and should be required to approve all major arms sales.

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THE DEFENSE
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CENTER FOR DEFENSE INFORMATION — A Project of the Fund for Peace

Volume Four Number Two **February 1975**

22,000 TACTICAL AND 8,000 STRATEGIC

30,000 U.S. NUCLEAR WEAPONS

The United States has nearly 30,000 nuclear weapons at home, at sea, in Europe, and in Asia. 8000 of these weapons are considered strategic weapons. 22,000 are considered tactical weapons. The main difference between strategic and tactical nuclear weapons is the difference in range. Tactical nuclear weapons have a shorter range but are sometimes more powerful than strategic weapons.

The 8000* U.S. strategic nuclear weapons are on (1) the 1054 U.S. Minuteman and Titan land-based missiles, (2) the 656 Polaris/Poseidon missiles on the 41 U.S. ballistic missile submarines, and (3) the nearly 500 U.S. SAC bombers. The U.S. has been producing strategic nuclear weapons at the rate of three per day for the past four years, and the total promises to grow to about 21,000 U.S. strategic nuclear weapons under the limits set by the November 1974 U.S.-Soviet Vladivostok Agreement.

***U.S. will have 8,500 strategic weapons by mid-1975.**

Less publicized and understood is the fact that nearly 22,000 U.S. *tactical* nuclear weapons are in position worldwide. 7000 U.S. tactical nuclear weapons are on land in Europe. Approximately 1700 are located on land in Asia. 2,500 tactical nuclear weapons (as well as 4,500 strategic nuclear weapons) are estimated to be aboard U.S. Navy combat ships. The remainder, approximately 10,800 tactical nuclear weapons, are assigned to U.S. bases and forces in the United States.

U.S. Tactical Nuclear Weapons Widely Dispersed

Europe	**7,000**
Atlantic Fleet (U.S. Navy)	**1,000**
Asia	**1,700**
Pacific Fleet (U.S. Navy)	**1,500**
United States	**10,800**
Total U.S. Tactical Nuclear Weapons	**22,000**

DEFENSE MONITOR IN BRIEF

- The United States has 30,000 nuclear weapons in Europe, Asia, the United States and at sea. Eight thousand of those are strategic nuclear weapons; 22,000 are tactical nuclear weapons.
- There are 7000 nuclear weapons aboard U.S. Navy ships and submarines. 4500 are strategic weapons on nuclear missile submarines. 2500 are short-range tactical nuclear weapons; 1400 of these are aboard U.S. aircraft carriers.
- There is no coherent doctrine for using land-based tactical nuclear weapons. Tactical nuclear weapons create an impossible command and control problem and they invite pre-emptive nuclear strikes by an enemy. If tactical nuclear weapons were used in a war abroad the likely result would be the destruction of the country in which they were used.
- The very presence of tactical nuclear weapons abroad creates a dangerous situation for the United States. The likelihood is great that an exchange of tactical nuclear weapons would escalate into a full-scale nuclear war.
- The dispersion of so many tactical nuclear weapons around the world greatly increases the danger of theft, terrorism, and accidents.
- Most land-based U.S. tactical nuclear weapons in Europe should be removed. All land-based tactical nuclear weapons in Asia should be removed. All nuclear bombs and nuclear air-to-surface weapons aboard U.S. aircraft carriers should be removed. The safety and security of U.S. citizens would be enhanced by such a move.
- The excessive secrecy surrounding tactical nuclear weapons hinders oversight by Congress and is unnecessary to preserve U.S. security. A national debate on U.S. tactical nuclear weapons is in the public interest.

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7,000 Tactical Nuclear Weapons in Europe

In Europe the U.S. and its NATO allies have 2250 aircraft, missile launchers, and nuclear cannons that can deliver 7000 U.S. tactical nuclear weapons. These weapons carry a combined explosive capability equivalent to an estimated 460,000,000 tons of TNT — roughly 35,000 times greater than the nuclear weapon that destroyed Hiroshima in 1945. These U.S. tactical nuclear weapons are in all NATO European states with the exception of Norway, Denmark, Luxembourg, and France. France maintains its own tactical nuclear weapons in France and Germany. U.S. nuclear forces in Europe are most heavily concentrated in West Germany where 207,000 U.S. military personnel are based

U.S. tactical nuclear weapons in Europe include at least four different kinds of surface-to-surface missiles (Lance, Sergeant, Honest John, and Pershing), two sizes of nuclear artillery shells (155 mm and 203 mm), and over 500 U.S. nuclear capable fighter-bombers. The aircraft can be loaded with air-to-surface missiles or four different sizes of bombs or a combination of missiles and bombs. The largest tactical nuclear missile has over 400 kilotons in explosive power, equivalent to over 30 "Hiroshimas". Forward-based systems such as the Pershing surface-to-surface missile or the nuclear-loaded aircraft are capable of attacking targets inside the Soviet Union from Western Europe.

U.S. Has 2-to-1 Advantage in Europe

The first U.S. tactical nuclear weapons were introduced in Europe in 1954, three years before the Soviet Union. Since that time the U.S. arsenal has grown dramatically and has undergone extensive changes as new U.S. tactical nuclear weapons replaced older ones. Soviet tactical nuclear deployment has been later, slower, and shows little weapon turnover. Soviet weapons in Europe have accumulated without much retirement of earlier weapons. This resembles the pattern of their deployment of strategic nuclear weapons

Still, there are two U.S. tactical nuclear weapons for each Soviet tactical nuclear weapon in Europe. Altogether U.S. forces in Europe have 7000 tactical nuclear weapons to 3000 to 3500 for Soviet military forces in Europe

The U.S. armed forces deployed nuclear weapons to Europe in the early 1950's to offset numerically superior Soviet forces in Central Europe. At the time the Eisenhower administration was seeking to check Soviet manpower advantages through a strategic policy which threatened "massive retaliation" and U.S. tactical nuclear weapons in Europe were part of that policy. When the U.S. first placed tactical nuclear weapons in Europe the Soviets had no tactical nuclear weapons. By the late 1950's the U.S. monopoly on tactical nuclear weapons was ended.

1700 U.S. Tactical Nuclear Weapons in Asia

Far less information has been released to the public by the Pentagon about the estimated 1700 tactical nuclear weapons that the U.S. maintains on land in Asia. U.S. tactical nuclear weapons are in Korea and the Philippines as well as at U.S. installations on Guam and Midway. Most of these weapons are for U.S. fighter-bombers, except in the Republic of Korea where Army and Air Force tactical nuclear weapons are based

Thousands of U.S. Nuclear Weapons at Sea

The U.S. today has approximately 7000 strategic and tactical nuclear weapons at sea. There are 284 ships and submarines in the U.S. Navy that can carry nuclear weapons. In 1965, only 38 percent of U.S. ships could carry nuclear weapons. Today 56 percent are nuclear capable and the percentage is increasing each year.

The U.S. Navy is capable of delivering up to 12,000 tactical nuclear weapons in bombs, depth charges, torpedoes, and missiles. Many of these are capable of carrying both conventional and nuclear explosives. Center for Defense Information estimates place the number of U.S. tactical nuclear weapons at sea at 2500*. This number of weapons carries an explosive punch equivalent to 150 million tons of TNT, more than 75 times the amount of explosives dropped from 1941 to 1945 on Germany and Japan by U.S. bombers. Over 90 percent of this nuclear destructive power is found in the 1400 tactical nuclear weapons aboard 14 U.S. attack aircraft carriers.

***This is a conservative estimate. The maximum loading of nuclear weapons would result in a number four times larger than the Center estimate. SUBROC (a rocket propelled nuclear torpedo) is assumed to be loaded one-third nuclear, two-thirds conventional. All other U.S. Navy tactical nuclear weapons are assumed to be one-quarter nuclear loaded and three-quarters conventional.**

AWESOME TACTICAL NUCLEAR ARSENAL IN EUROPE

"The significance of our nuclear weapons stockpile in Europe, only in Europe, becomes all too apparent when one realizes that the destructive force, in TNT equivalent, of the nuclear weapons we have currently stockpiled alone is more than 20 times that of the combined total force of all the air ordnance expended in World War II, the Korean war and the war in Vietnam."

Senator Stuart Symington
March 7, 1974

Nearly 15,000 Nuclear Weapons in U.S.

An estimated 14,800 U.S. nuclear weapons are kept in the United States. 4000 strategic nuclear weapons are deployed at U.S. Minuteman and Titan missile sites and at SAC bomber bases. An additional 10,800 U.S. tactical nuclear weapons are estimated to be in the custody of U.S. forces in the U.S. The seven Army divisions on active duty in the U.S. have the full spectrum of tactical nuclear weapons. Stateside Navy and Air Force units also have a full complement of tactical nuclear weapons. Thousands more are stockpiled at U.S. storage facilities.

TACTICAL NUCLEAR WEAPONS IN SEARCH OF A DOCTRINE

According to Secretary of Defense James Schlesinger, the U.S. deploys nuclear weapons to Europe to: (1) deter Soviet use of tactical nuclear weapons and Warsaw Pact attacks, and (2) to provide a nuclear option short of all-out war should deterrence fail and our conventional defenses collapse. As Morton Halperin, former Deputy Assistant Secretary of Defense, recently put it, "The NATO doctrine is that we will fight with conventional forces until we are losing, then we fight with tactical nuclear weapons until we are losing, and then we will blow up the world."

No one yet has been able to devise any reasonable set of scenarios for the use of our European-based tactical nuclear weapons. Defense Secretary Schlesinger had admitted to continuing to search unsuccessfully for a doctrine whereby tactical nuclear weapons could be confidently used without triggering all-out war. That is likely to be a fruitless search. It is a Center conclusion that *there is no rational doctrine for the use of the U.S. land-based tactical nuclear weapons in Europe and Asia.*

Defending Allies By Destroying Them

Something is wrong with a strategy which, if implemented, would destroy the country it is designed to defend. The use of 10 percent of the 7000 U.S. tactical nuclear weapons in Europe would destroy the entire area where such massive nuclear exchanges occured. War games practiced by NATO troops indicate the tremendous collateral damage that would be inflicted upon cities and people bordering the battle area. A NATO war game named Carte Blanche was run for 48 hours during which 335 tactical nuclear weapon explosions were simulated, 268 on German territory. A very conservative estimate placed Germans killed at between 1.5 and 1.7 million plus an additional 3.5 million wounded. In the six years of World War II 305,000 Germans were killed and 780,000 were wounded. Thus a very limited tactical nuclear war would produce over five times as many German casualties in two days as occurred in the entire Second World War.

A similar NATO war game, Operation Sagebrush, simulated the use of 275 tactical nuclear weapons that ranged in yield from 2 to 40 kilotons. According to the evaluation of the exercise, "the destruction was so great that no such thing as limited nuclear war was possible in such an area." Former Assistant Secretary of Defense Alain Enthoven, in testimony before the Senate Foreign Relations Committee, quoted a Defense Department report on war games conducted in Europe in the 1960's as saying that:

> **"Even under the most favorable assumptions about restraint and limitations in yields and targets, between 2 and 20 million Europeans would be killed in a limited tactical nuclear war. . . and a high risk of 100 million dead if the war escalated to attacks on cities."**

Any Nuclear War Likely to be Total

Once the nuclear threshold has been broken, it is highly likely that the nuclear exchanges would escalate. Radio, radar, and other communications would be disrupted or cut. The pressures to destroy the adversary's nuclear forces before they land a killing blow would lead to preemptive attacks. In the confusion, subtle peacetime distinctions between lower level tactical nuclear war and higher level tactical nuclear war, and all-out spasm nuclear war would vanish. Once the threshold is crossed from conventional warfare to nuclear warfare, the clearest "firebreak" on the path to complete nuclear holocaust will have been crossed.

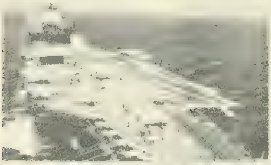
Small Weapons Trigger Big Ones

One risk of developing tactical nuclear weapons, especially those now euphemistically called "mini-nukes", is that they may create the illusion that a limited nuclear war can be fought. Small weapons such as the 155mm nuclear artillery projectiles have already been introduced. The trend is for more of the same. As smaller, "cleaner", and more accurate tactical nuclear weapons are added to the U.S. arsenal, they will add to the dangerous illusion that tactical nuclear weapons can be used with no risk of escalation.

This overlooks two factors. First, the U.S. tactical nuclear arsenal is still loaded with large "Hiroshima-size" weapons. Second, the Soviet Union would respond massively to U.S. nuclear attacks. Even if all larger U.S. tactical nuclear weapons were replaced by new "mini-nukes", using them would trigger the older, bigger, and "dirtier" Soviet weapons with the same consequences for persons living in the area and the same resultant escalation.

The idea of a limited nuclear war is an illusion. However, it may encourage policy-makers to be more reckless and make nuclear war, especially during acute crises, more likely.

U.S. Navy Tactical Nuclear Weapons



U.S. Attack Aircraft Carriers [illegible]

Forward-based Aircraft [illegible]

[illegible] Bomb

[illegible] Surface-to-Air Missile [illegible]

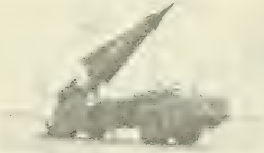
[illegible]

Anti-Submarine [illegible]

[illegible]

U.S. Army and U.S. Air Force Tactical Nuclear Weapons

Lance Surface-to-Surface Missile [illegible]



[illegible]

[illegible] Surface-to-Surface Missile [illegible]

Nuclear Artillery [illegible] NATO [illegible]

Honest John Surface-to-Surface Missile [illegible]

[illegible] Surface Missile [illegible]

Sergeant Surface-to-Surface [illegible]

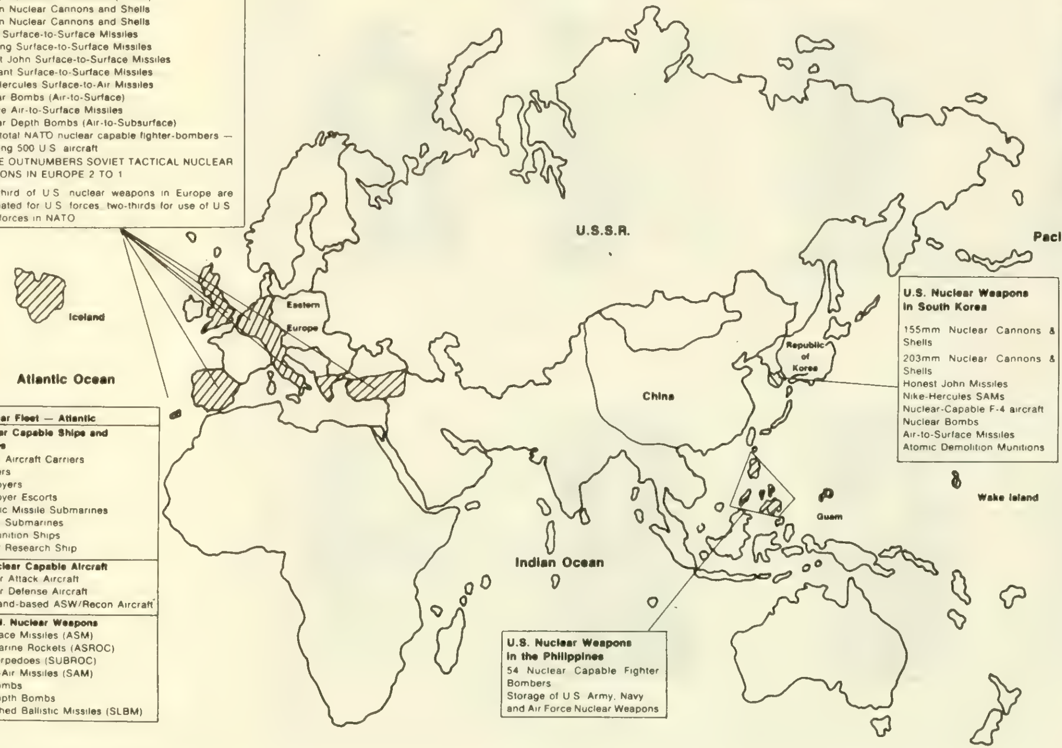
Nuclear Air-to-Surface Bombs [illegible] NATO [illegible]

16,000 U.S. Nuclear Weapons Abroad

7,000 U.S. Tactical Nuclear Weapons in Europe (NATO)*

Atomic Demolition Munitions (ADMs)
155mm Nuclear Cannons and Shells
203mm Nuclear Cannons and Shells
Lance Surface-to-Surface Missiles
Pershing Surface-to-Surface Missiles
Honest John Surface-to-Surface Missiles
Sergeant Surface-to-Surface Missiles
Nike-Hercules Surface-to-Air Missiles
Nuclear Bombs (Air-to-Surface)
Walleye Air-to-Surface Missiles
Nuclear Depth Bombs (Air-to-Subsurface)
2 000 total NATO nuclear capable fighter-bombers — including 500 U S aircraft
FORCE OUTNUMBERS SOVIET TACTICAL NUCLEAR WEAPONS IN EUROPE 2 TO 1

*One-third of U S nuclear weapons in Europe are designated for U S forces two-thirds for use of U S allied forces in NATO



U.S. Tactical Nuclear Weapons Abroad	
Europe	7000
Atlantic Fleet	1000
Asia	1700
Pacific Fleet	1500
Total	**11,300**

U.S. Strategic Weapons At Sea	
Atlantic	4016
Pacific	528
Total	**4544**

U.S. Nuclear Weapons in South Korea

155mm Nuclear Cannons & Shells
203mm Nuclear Cannons & Shells
Honest John Missiles
Nike-Hercules SAMs
Nuclear-Capable F-4 aircraft
Nuclear Bombs
Air-to-Surface Missiles
Atomic Demolition Munitions

U.S. Nuclear Weapons in the Philippines

54 Nuclear Capable Fighter Bombers
Storage of U S Army, Navy and Air Force Nuclear Weapons

U.S. Nuclear Fleet — Atlantic

162 Nuclear Capable Ships and Submarines

6 Attack Aircraft Carriers
2 Cruisers
47 Destroyers
32 Destroyer Escorts
30 Ballistic Missile Submarines
37 Attack Submarines
7 Ammunition Ships
1 Escort Research Ship

U.S.N. Nuclear Capable Aircraft

288 Carrier Attack Aircraft
144 Carrier Defense Aircraft
108 P-3 Land-based ASW/Recon Aircraft

5016 U.S.N. Nuclear Weapons

Air-to-Surface Missiles (ASM)
Anti-Submarine Rockets (ASROC)
Nuclear Torpedoes (SUBROC)
Surface-to-Air Missiles (SAM)
Nuclear Bombs
Nuclear Depth Bombs
Sea-Launched Ballistic Missiles (SLBM)

U.S. Nuclear Fleet —Pacific

122 Nuclear Capable Ships and Submarines

8 Attack Aircraft Carriers
3 Cruisers
38 Destroyers
32 Destroyer Escorts
11 Ballistic Missile Submarines
20 Attack Submarines
10 Ammunition Ships

U.S.N. Nuclear Capable Aircraft

384 Carrier Attack Aircraft
192 Carrier Defense Aircraft
108 P-3 ASW/Recon Aircraft

2028 U.S.N. Nuclear Weapons

Air-to-Surface Missiles (ASM)
Anti-Submarine Rockets (ASROC)
Nuclear Torpedoes (SUBROC)
Surface-to-Air Missiles (SAM)
Nuclear Bombs
Nuclear Depth Bombs
Sea-Launched Ballistic Missiles (SLBM)

▨ **Key:** Areas Where U S Nuclear Weapons are Located

FOUR NUCLEAR SAFETY DILEMMAS

Dilemma 1: Danger From Nuclear Terrorists

The risk of war with the Soviet Union has long been regarded as the primary threat to the security of the United States. In hopes of averting such a catastrophe, thousands of man-years have been spent by analysts exploring how such a war is likely to erupt.

The research and contingency plans designed to control escalation of crises and limited wars, to prevent accidental war or unauthorized attacks, and to deter a surprise attack, may be ignoring a likelier danger to U.S. national security — the nuclear terrorist.

A half-dozen terrorists with a home-made or hijacked nuclear weapon could cause thousands of deaths in a city like New York. Yet thousands of nuclear weapons are deployed by the United States, Soviet, French, and British forces in many different locations, some with questionable security precautions. If a terrorist group stole and detonated one "small" 10 kiloton nuclear weapon in New York City, the explosion could cause nearly 100,000 deaths — more than all the U.S. battle deaths incurred together in the Vietnam *and* Korean Wars.

One of the hundreds of U.S. tactical nuclear bombs in the one megaton range, if exploded on Manhattan Island, would inflict casualties exceeding the *combined* totals of the war dead from the American Revolution, the War of 1812, the Mexican War, the U.S. Civil War, the Spanish-American War, the First World War, World War II, the Korean War, and the Vietnam War. Nearly one-and-a-half million people would perish in such an event.

More than 50 major terrorist groups are reported to exist worldwide. Urban guerrilla activities, Olympic murders, airplane hijackings, terror bombings, and airport massacres are all well known.

How safe are nuclear weapons from theft by terrorist groups? Not very, according to the few indicators available in this highly classified area. U.S. Army Special Forces exercises have shown that nuclear weapons storage areas can be penetrated successfully without detection despite guards, fences, and sensors. Their example could obviously be followed by a daring and well-organized terrorist organization.

The United States, its allies, and the Soviet Union have now deployed thousands of tactical nuclear weapons across the world, each in an effort to bolster its own national security. In doing so, these governments have made their societies more vulnerable to the nuclear terrorist. Our cities, as a result, are more likely to become casualties from nuclear terrorist attacks than from attacks by other countries.

Dilemma 2: Seizure by Allies

More than half of all U.S. nuclear weapons are stationed abroad or on the high seas. Countries where U.S. nuclear weapons are reportedly stationed include:

Federal Republic of Germany
United Kingdom
Netherlands
Belgium
Italy
Iceland
Greece
Turkey
Spain
Portugal
Philippines
Republic of Korea

Once the U.S. deploys nuclear weapons to an allied country, we put in jeopardy our control of those weapons if that nation ever becomes unfriendly to the United States. Allied seizures of U.S. weapons could result in the United States having to fight its way into an allied country in order to rescue its own weapons.

This scenario takes on more plausibility in the light of the recent Greek and Turkish fighting on Cyprus. Both Greece and Turkey are host countries for U.S. tactical nuclear weapons and U.S. security forces were put on maximum alert guarding the weapons compounds during the short war between these two NATO allies.

Too many of the allied host countries that permit U.S. nuclear bases are dictatorships with oppressive regimes that spark dissent. Franco of Spain and Chung Hee Park of Korea are vintage examples of the genre. Some allies who permit U.S. nuclear weapons already have domestic insurrections on their hands. The Philippines and the United Kingdom are current examples. In Greece and Portugal recent coups d'etat have changed the complexion of the ruling groups. In countries plagued by civil wars and coups, U.S. tactical nuclear bases may not be safe from our "allies". During internal political disruptions in allied countries, U.S. bases might find themselves caught in the middle of a firefight. One side or the other might find it advantageous, or even necessary, to seize U.S. tactical nuclear weapons to gain the upper hand in the local struggle. Nor can we discount the possibility that allies such as the Republic of Korea might seize U.S. weapons in order to defend themselves from — or possibly to attack — their antagonists.

Letter From A Concerned U.S. Soldier to Senator Symington

I am aware of the existence of [U.S.] tactical nuclear warheads in Greece and in Turkey If Greece and Turkey should come to blows and seek to gain the advantage by forcibly taking these warheads to use upon the other it would undoubtedly cost many American lives and plunge the U.S. into an untenable position . . . No more than 4 to 6 U.S. soldiers guard the bunkers which store the nukes! Most of the troops (about 40 per detachment) are housed about a quarter of a mile from the bunkers and could easily be isolated from the warheads."

Dilemma 3. Unauthorized Use of Nuclear Weapons

[illegible]

[illegible]

Dilemma 4. Nuclear Accidents

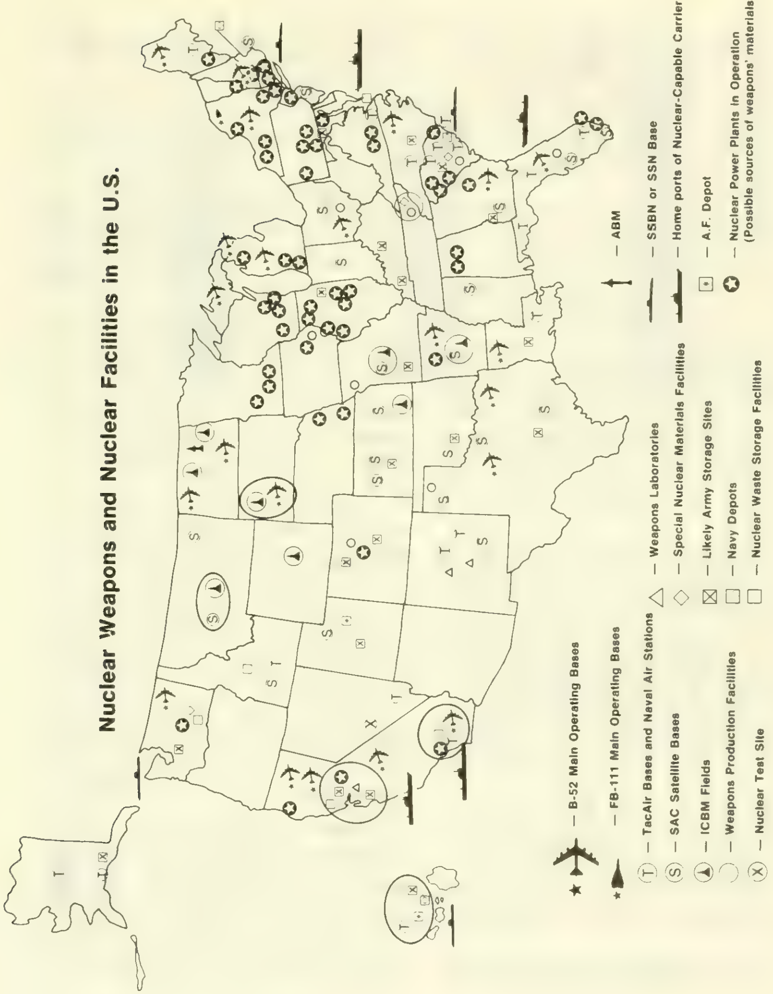
[illegible]

[illegible]

"BROKEN ARROWS"
NUCLEAR ACCIDENTS ADMITTED BY THE PENTAGON

[illegible]

Nuclear Weapons and Nuclear Facilities in the U.S.


— B-52 Main Operating Bases
— FB-111 Main Operating Bases
T — TacAir Bases and Naval Air Stations
S — SAC Satellite Bases
— ICBM Fields
— Weapons Production Facilities
X — Nuclear Test Site
— Weapons Laboratories
— Special Nuclear Materials Facilities
— Likely Army Storage Sites
— Navy Depots
— Nuclear Waste Storage Facilities
— ABM
— SSBN or SSN Base
— Home ports of Nuclear-Capable Carriers
— A.F. Depot
— Nuclear Power Plants in Operation (Possible sources of weapons' materials)

CENTER CONCLUSIONS

The secrecy surrounding nuclear weapons has made it nearly impossible for the Congress and the public to understand how many U.S. tactical nuclear weapons exist, where they are, how they would be used, and what the effects of their use would be. Increased Congressional oversight and public understanding is necessary and secrecy should be abandoned to the extent necessary to guarantee it.

Most of the U.S. tactical nuclear weapons overseas can be brought home with no loss in national security. Indeed, there should be a net gain in security as the chances decrease for accidents, for theft, and for unauthorized use of the weapons. Increased U.S. national security would be the result of adoption of these Center recommendations:

1. **Substantially cut the number of U.S. nuclear weapons in Europe.** Perhaps no more than 500 would be enough to guarantee the participation of the U.S. strategic deterrent forces, yet this number would substantially cut the safety problems and costs of maintaining the force. Phasedowns could be gradual (e.g. 1000 per year) and might serve to produce similar Soviet phasedowns as the danger to them somewhat receded.

2. **Restructure the remaining tactical nuclear weapons in Europe so that they are under the continuous operational control of the Supreme Commander of NATO (SACEUR).** Weapons should be taken away from frontline field commanders of local units and deployed in the rear. This will improve security and control of these weapons.

3. **Remove all Quick Reaction Alert Aircraft (QRA).** Such systems are vulnerable to a surprise attack and lend themselves to the danger of hair trigger reactions and unauthorized use by U.S. and NATO pilots. Their missions can be taken over and performed more effectively by the ballistic missile submarine fleet.

4. **Remove all forward deployed atomic artillery.** Such weapons are subject to unauthorized use if forward units are surrounded and under attack. Moreover they might be easily captured if not used and turned against the NATO army they were designed to serve. Their forward deployment makes it likely that any war in Europe will be nuclear.

5. **Remove all forward deployed atomic demolition munitions (ADMs) and all of those not permitted to be prechambered where that is necessary.** Forward deployed ADMs, even if prechambered, would guarantee nuclear escalation of a conventional conflict — something to be avoided. ADMs that have not been prechambered to the optimal depth can cause excessive nuclear fallout and high damage to surrounding civilians and troops.

6. **Remove aircraft and surface-to-surface missiles capable of hitting targets in the Soviet Union or deploy them to the rear where their status as tactical weapons is clear to the USSR.** This also reduces the danger of unauthorized launching of bombs and missiles by U.S. forces directly against the Soviet Union.

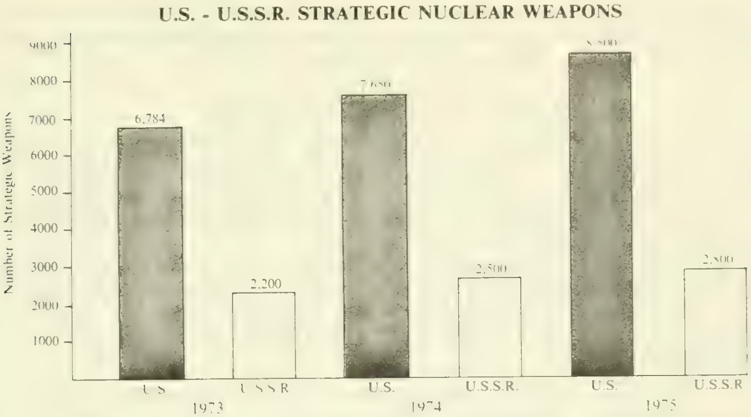
7. **Remove all nuclear weapons from South Korea, the Philippines, and other Asian states where they exist.** Such U.S. weapons pose dangers of theft, unauthorized use, allied seizures, and accidents. They threaten to involve the U.S. in areas where we would be forced to intervene. Such situations not only make our foreign policy hostage to our weapons policy but might force the U.S. to create another precedent of nuclear first-use.

8. **Substantially increase the security precautions around U.S. nuclear weapons compounds and more intensively screen U.S. personnel who handle tactical nuclear weapons.**

9. **The program to "modernize" tactical nuclear weapons should be shelved.** Nothing is gained by their introduction and the dangers of creating illusions of "usable" nuclear weapons and blurring the distinction between conventional and nuclear war both increase rather than reduce the threat to U.S. national security.

10. **Nuclear capable missiles, and missile launchers, should not be sold or given to countries that have a near-nuclear capability.** To do so increases the risks of new countries "going nuclear" and increases the dangers to U.S. security thereafter.

11. **Remove all nuclear weapons from U.S. aircraft carriers.** Carrier aircraft have no strategic nuclear role that cannot be better carried out by other systems. Carriers are unlikely to exist for long in a nuclear war and their primary remaining useful mission is as mobile launching platforms for aircraft engaged in conventional attacks. Nuclear weapons aboard would degrade the capability of the carriers to perform that role.



Since mid-1973 the U.S. has deployed almost three times as many new strategic nuclear weapons as the Soviet Union.

(DoD Figures)

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[From Newsday, May 1, 1975]

DOES THE SHAH NEED THOSE F–14S?

MORE AEROSPACE JOBS ON LONG ISLAND ARE NOT WORTH THE HIGHER TENSIONS THAT BILLIONS OF DOLLARS OF AMERICAN ARMS SALES ARE PRODUCING IN THE PERSIAN GULF AREA, THESE DEFENSE ANALYSTS SAY.

(By Stefan Leader and Bob Berman)

Many Long Island residents were probably very happy when Grumman Aerospace Corp. announced last year that Iran will buy 80 F–14 jet fighters. The sale means that the F–14 production run will be longer—resulting in more jobs for Long Island aerospace workers. The $1.8 billion that Iran will pay for these planes will help Grumman's ailing financial situation and provide a shot in the arm for Long Island's economy.

These are real and immediate benefits, but the U.S. policy of growing political involvement and unrestrained arms sales to the Persian Gulf, of which the F–14 sale is part, is not without some significant costs and dangers. In time these costs and dangers could make the financial gain seem rather small and insignificant.

U.S. political and military involvement in the Persian Gulf has been expanding rapidly in recent years. The leading edge of our involvement in this area—as it was in Southeast Asia in the 1950s and 1960s—is military assistance and arms sales. The F–14 sale is the tip of the iceberg.

The United States is not the only supplier of arms to the Persian Gulf, but it is by far the largest one. In 1974 the United States sold more than $4.4 billion worth of arms to Persian Gulf countries. Russia sold $1.5 billion; France sold $1.5 billion; Britain sold $50 million. Saudi Arabia and Iran have been the chief customers for U.S. arms. In 1974, these two countries alone bought $4.4 billion worth of American weapons. Recently Iran and the United States announced a $15 billion five-year trade deal that is expected to include the delivery of $5 billion worth of American arms. U.S. arms are helping to make Iran a major world military power. The major countries of the region are now spending about $5.8 billion a year on their military forces. Just five years ago the total was $1.6 billion.

One justification U.S. officials give for arming Iran has been to make direct U.S. involvement in the area unnecessary. There are indications, however, that Pentagon officials have decided that an American presence in the area is necessary in any case. The Navy has begun regular visits to the Persian Gulf and deployment of a carrier task force to the Indian Ocean. At the same time, the United States is in the process of developing a base at Diego Garcia and there are plans to use the former British base at Masirah. In addition, the U.S. Middle East force has a base at Bahrain. All of this points to growing American involvement in a highly volatile region of the world.

The character of U.S. military assistance and arms transfers has undergone major changes in recent years. In the past it was unusual for the United States or any other country to provide or sell its most advanced weapons to foreign governments. With the possible exception of some favored allies, foreign recipients of military aid had to content themselves with older or obsolecent equipment.

This pattern has changed quite radically in recent years, particularly in the Middle East and Persian Gulf, where oil-rich governments can afford to pay for the most up-to-date equipment. In addition to F–14s now on order, Iran has already received the F–4 Phantom. The F–4 was, and still is, one of the first-line fighter aircraft of the U.S. Air Force. Iran will also be adding ocean-going DD–963 destroyers to its navy soon after the last of these destroyers are introduced into the U.S. Navy. It will soon receive improved Hawk surface-to-air missiles and it has TOW antitank missiles. All of these are currently being added to the U.S. inventory.

From Britain, Iran has purchased Chieftain tanks, the first-line tank of the British Army. Kuwait has announced plans to purchase the Mirage F–1 aircraft from France, and will begin adding it to its inventory at the same time France acquires the Mirage in large numbers for its own air force. The fundamental point is that the sophistication of the weapons available to the countries of the Persian Gulf as escalated substantially in recent years and a full-scale war in the region is likely to prove highly destructive and very costly.

This infusion of advanced military technology has greatly increased the offensive military capabilities of several Persian Gulf countries, Iran in particular. The countries in the region are acquiring the capability to make war at ever-increasing levels of potential destructiveness. Neighbors who previously did not have the means to threaten each other are now becoming capable of waging full-scale wars. Such conflicts could lead to U.S. involvement. We must also ask whether the United States may also be creating military powers that some day will turn against us.

Supplying these advanced long-range weapons, such as the F–4, F–14, and DD–963 destroyers to Iran, has strategic implications beyond the Persian Gulf. The Iranian military build-up and Iranian aid to Pakistan (Iran has given 90 F–86 jets and several modern C–130 transports to Pakistan) could in the future be seen as a threat by India. At present Iranian-Indian relations are cordial but a continued Iranian build-up and more Iranian aid to Pakistan could turn the relations between these two countries sour over the next few years.

In similar fashion, Saudi and Kuwaiti arms may soon have an impact on the Arab-Israeli military balance. As Saudi Arabia and Kuwait grow in power, the Israelis may have to begin to weigh them in the total balance. This may make the Israelis less secure and increase Israel's need for U.S. military assistance.

With American assistance, Iran has become the dominant military power in the Persian Gulf. Iranian military forces are twice as large as those of Iraq and five times larger than those of Saudi Arabia. Iran spends on military forces four times what Iraq spends. This expansion of Iranian military power poses significant risks, both for the United States and for other Persian Gulf states.

A few years ago the late Sen. Richard Russell (D-Ga.), commenting on U.S. military capabilities, pointed out that "if Americans find it easy to go anywhere and do anything, they will always be going somewhere and doing something." The same can be said of Iran. If we make it easy for Iranians "to go anywhere and do anything," they will "always be going somewhere and doing something." By massively expanding Iranian military capabilities the United States may be encouraging Iranian ambitions to dominate the Persian Gulf. Even if the present regime remains in power there are dangers in this policy.

Until recently, the shah clearly shared U.S. concerns about a Soviet threat to Iran. While the shah still speaks of the Soviet danger, Iran has increasingly deployed its armed forces to the south. Three-fourths of the F–14s ordered will be deployed there. This has caused some alarm among its neighbors. There is increasing evidence of the shah's fundamental ambition to rebuild the ancient Iranian empires.

In justifying U.S. arms sales to Iran recently, U.S. officials have emphasized the shared interest between the United States and Iran in safeguarding the flow of oil from the Persian Gulf to the United States, Europe and Japan. The shah has insisted that he will not participate in another embargo under any circumstances. While there is no reason to doubt the shah's commitment to this goal—especially given the very high prices he is now getting for his oil—there are some potential dangers. One possibility is that the shah's ambitions and Iran's growing military power might end with the shah in control of all Persian Gulf oil. The U.S. policy of virtually unlimited arms sales to Iran increases this danger.

The British recently set an important precedent by refusing to sell Jaguar fighter-bombers to Libya because of the refusal of the Libyan government to provide assurances that the planes would not be transferred to Egypt or other third countries. While Pentagon officials insist that they have not sold Persian Gulf countries everything asked for, not many requests seem to have been refused.

What is needed therefore is similar restraint by the United States, first in the form of a temporary embargo and second, restrictions on long-range offensive systems such as the F–14 and the F–4. The third and most important conference of all arms suppliers to work out some meaningful limits on the flow of arms to this highly volatile area of the world.

[Stefan Leader and Bob Berman work for the Center for Defense Information, a private research institute in Washington.]

[From the Congressional Record—Senate, April 15, 1975]

Introductory Remarks by Senator Percy on S. 1439

Mr. PERCY. Mr. President, the Government Operations Committee during the past Congress gave major emphasis to the reorganization of the executive branch of the Government in the fields of natural resources, energy research and development and nuclear licensing regulation. In addition to hearings on the creation of a Department of Energy and Natural Resources and the enactment of the Federal Energy Administration, the committee dealth with the creation of the Nuclear Regulatory Commission, with authority over the licensing of nuclear reactors and nuclear exports of certain kinds, and the Energy Research and Development Agency, to be a comprehensive agency to promote research in all forms of energy.

During this Congress the committee has been studying the question of the organization of the Government for the export of strategically significant materials. We found that the Commerce Department Office of Export Administration performs the vast bulk of the licensing for export of most strategically important products and commodities. Yet we found that the State Department licenses export of arms, ammunition, and the implements of war under the Mutual Security Act, and that the Treasury Department licenses certain exports under the Trading With the Enemy Act. And, we found that, when we enacted the NCR/ERDA legislation, we had inadvertently permitted the licensing for export of nuclear facilities and materials to rest in the Nuclear Regulatory Commission, whereas the authority for approval of nuclear technology exports rests in the Energy Research and Development Administration.

This illogical, inefficient separation of similar functions among at least five agencies is being corrected by the bill I am introducing today with the cosponsorship of the distinguished chairman of the Government Operations Committee, Senator RIBICOFF, and the distinguished Senator from Ohio, Senator GLENN, a new and highly valued member of our committee.

This bill, the Export Reorganization Act of 1975, rests on the essential logic that like functions should be grouped in one agency. There is ample precedent for centralizing these sentitive export licensing functions, which might appear to require administration by other agencies, in the Commerce Department. The Commerce Department already licenses exports of the components of nuclear reactors. Such exports have increased in number, reflecting the fact that the emphasis of U.S. nuclear exports has shifted from complete reactors toward reactor aprts and related assemblies.

Because it is the agency that has been, since World War II, responsible for licensing strategic exports, including exports to the Soviet Union and other Communist countries under the COCOM process, the Commerce Department has had a great deal of experience in coordinating its sensitive licensing decisions with other departments and agencies. For example, at the present time the Secretary of Defense must sign off on exports of potentially strategic goods to the Communist countries before Commerce issues the actual license. And, the Attorney General must approve decisions to export eavesdropping equipment before Commerce issues a license.

Similarly, the Export Reorganization Act of 1975 requires that, before the Commerce Department may issue a license for the export of nuclear facilities, materials, and technology, it must have the certification of the Nuclear Regulatory Commission that the country to which any such technology, facility or material is to be exported has safeguards at least substantially comparable to the safeguards that the NRC requires be applied to nuclear facilities in the United States.

This is an extremely important provision. By removing from the Nuclear Regulatory Commission the responsibility for issuing licenses, and by requiring that it concentrate on the critical, judgmental question whether or not that export is in the public interest in that it is made under adequate safeguards, we will hopefully upgrade application of safeguards worldwide. By safeguards, we refer to the physical security systems that are used to protect nuclear facilities and materials shipments, and the materials accountability systems that are employed to insure that nuclear materials are not diverted by theft or other means to possibly military uses.

The importance of this aspect of the Export Reorganization Act of 1975 has been underscored by the Secretary of State and the Director of the Arms Control and Disarmament Agency.

Expressing a new emphasis in American policy in a major address to the United Nations in October 1974, the Secretary indicated that American policy must change. He said:

"The United States and a number of other countries have widely supplied nuclear fuels and other nuclear materials in order to promote the use of nuclear energy for peaceful purposes. This policy cannot continue if it leads to the proliferation of nuclear explosives."

ACDA Director Ikle has said that the export of peaceful nuclear technology directly threatens the proliferation of military nuclear weapons capability, and that such exports must be given new scrutiny.

Just as the bill requires that the Nuclear Regulatory Commission give prior approval before the Commerce Department issues export licenses for nuclear facilities, materials, and technology, so the bill requires that the State Department give prior approval before the Commerce Department may issue licenses. for exporting munitions. And, before the Commerce Department issues licenses for the export of products to "blocked" countries under the Trading With the Enemy Act, Treasury must give its approval.

Thus, our bill establishes a uniform system for the export licensing of a number of strategic materials and products.

Mr. President, in addition to the benefits that I hope will result from the centralizing of this important governmental function in one agency, I would hope that the bill will also have the critically important result of upgrading this Nation's concern for the safeguarding of nuclear facilities and materials. This objective is a critically important one, important in the most direct ways to the health and safety of the people of this country, and to our common defense and security.

Mr. President, I ask unanimous consent that a statement on the bill by Senator GLENN be included in the RECORD, as if read, immediately following the statement of Senator RIBICOFF.

Mr. President, I also ask unanimous consent that the text of the bill be printed in the RECORD following the statement of Senator GLENN.

Mr. RIBICOFF. Mr. President, as chairman of the Committee on Government Operations, I am pleased to join the distinguished ranking minority member, Mr. PERCY, in introducing a bill that provides major interagency reform of the present system for exporting strategically sensitive commodities from the United States.

The bill, the Export Reorganization Act of 1975, transfers to the Department of Commerce the licensing and approval authorities for certain exports which now reside in the Department of State, the Department of the Treasury, the Energy Research and Development Administration and the Nuclear Regulatory Commission. At the same time, the bill requires the Secretary of Commerce to obtain approval from the heads of agencies whose expertise is vital for insuring that the decisions on whether to export strategically significant commodities are made in full consideration of our vital national interests.

By centralizing the export licensing and approval function in the Commerce Department, the bill recognizes the lead agency role already played by Commerce in export licensing—and thereby promotes economy and efficiency with respect to a vital function in the executive branch. By requiring the Secretary of Commerce to coordinate with the agencies having the lead technical and policy roles in evaluating the impact of significant exports, the bill recognizes a procedure for consultation that dates back to 1949 and thereby promotes interagency coordination and cooperation.

Mr. President, there is great wisdom in singling out a Federal agency to which nearly all persons and commercial interests seeking to engage in foreign commerce can apply for the necessary export license. The Commerce Department has served as that agency since export controls were first applied at the start of World War II. It has developed the expertise that now makes it possible for the Department's Office of Export Administration to process and take action within 1 week on 90 percent of the nearly 300 applications it receives daily. At least 95 percent are acted on in less than 2 weeks.

The remaining 5 percent are the most difficult cases requiring interagency review of technical and policy questions. Under present law, for example, the Secretary of Defense must sign off on virtually all applications to export to Communist countries; the Secretary of Agriculture must approve exports of agricultural commodities, and the Attorney General must approve the export of eavesdropping equipment.

The licensing functions being transferred to the Commerce Department by this act involve exports of a no less sensitive nature.

The function of licensing the export of arms, ammunition and the implements of war under the Mutual Security Act is transferred from the State Department, but no such license can be issued by the Secretary of Commerce without the written approval of the Secretary of State.

The function of licensing exports under the Training With the Enemy Act is transferred from the Treasury Department, but no such license can be issued by the Secretary of Commerce without the written approval of the Secretary of the Treasury.

The function of approving the export of nonmilitary nuclear technology is transferred from the Energy Research and Development Administration, and the function of licensing exports of civilian nuclear facilities and materials is transferred from the Nuclear Regulatory Commission. No such approval or license for civilian nuclear exports can be issued by the Secretary of Commerce unless the Nuclear Regulatory Commission makes a determination that the safeguards against nuclear theft, diversion and sabotage are comparable to safeguards required by the Commission to obtain a commercial nuclear license in the United States.

The Commerce Department already issues export licenses for component parts of nuclear reactors on the advice of ERDA, not NRC. Ironically, nuclear components now comprise the major share of our nuclear exports, reflecting a shift away from the sale of technology, such as blueprints, and the complex subassemblies that other nations cannot produce themselves.

The NRC now has no voice in either the export of U.S. nuclear technology or the export of components parts that other nations need to convert that technology into operating reactors. Therefore, NRC has been excluded from playing any role in the lion's share of the Nation's nuclear exports, despite the fact that it is designated by the Atomic Energy Act to regulate such exports in the interest of public health and safety and common defense and security. This problem is compounded by the fact that NRC has little more than rubberstamp authority over the exports of facilities and materials which it now licenses, based on international agreements and safeguards findings provided by ERDA.

The act transfers from the Energy Research and Development Administration to the Department of State the function of negotiating with other nations agreements for cooperation on developing nonmilitary nuclear technology, facilities and materials for research and electrical power generating purposes. The act requires the Nuclear Regulatory Commission to establish safeguards criteria to be used by the State Department in negotiating these agreements. The agreements for cooperation provide the basic groundrules for making nuclear exports to particular nations.

The act also transfers from the Energy Research and Development Administration to the Nuclear Regulatory Commission functions relating to safeguards for commercial nuclear technology, facilities and materials which are exported by the United States. In addition, the Commission has transferred to it from the Department of Transportation all functions involved in establishing regulations for the transportation of radioactive materials in interstate and foreign commerce.

In order to promote adequate safeguards against the conversion of peaceful nuclear exports to weapons purposes, the act makes several important requirements of the Nuclear Regulatory Commission:

The Commission must file a nuclear proliferation assessment statement with the Arms Control and Disarmament Agency with respect to each strategically significant nuclear-export application and offer the agency an opportunity to comment on the advisability of the export.

The Commission must establish and operate a special training program for technicians from nations which purchase commercial nuclear exports from the United States. The training will involve the most advanced safeguards techniques for detecting diversion of nuclear materials and preventing theft and sabotage.

The Commission must conduct a comparative study of physical-security and materials-accounting safeguards regulations and guidelines of the United States and of the International Atomic Energy Agency, and make recommendations to the President and to Congress for the upgrading of these safeguards.

The Commission must study and make recommendations on the feasibility of internationalizing all strategically significant aspects of the commercial nuclear fuel cycle in all parts of the world to minimize the danger of nations or subnational groups converting peaceful plutonium or uranium for use in atomic bombs or deadly dispersal devices.

Mr. President, I consider the Export Reorganization Act an extremely important piece of legislation because it applies a uniform system of interagency coordination, with appropriate checks and balances, to the process of licensing strategically significant commodities for export by the United States.

The proposed reorganization of Federal controls over peaceful nuclear exports is especially crucial because it seeks to reverse the present dangerous proliferation of commercial reactors and materials throughout the world without adequate safeguards to prevent the spread of nuclear weapons.

The nuclear export policies and practices of this Nation are not only dangerous; they are scandalous. For years we have been exporting our commercial nuclear technology both in the form of blueprints and actual reactors without insisting on safeguards that are strict enough to prevent their conversion to weapons purposes.

For years we have been the sole exporter of the enriched uranium needed to fuel the free world's commercial reactors, but we never used this monopoly to insist on safeguards that would prevent the plutonium byproducts of these reactors from being made into atomic bombs.

We have ratified the Nuclear Non-Proliferation Treaty, but we continue to sell our nuclear exports to non-NPT countries like India which refuse to place all of their nuclear facilities under even the limited safeguards of the International Atomic Energy Agency.

IAEA safeguards are designed only to detect diversion of nuclear materials by nations, not to prevent theft and sabotage by terrorist groups. It is questionable whether present IAEA safeguards are adequate to foil a nation that seeks to secretly stockpile plutonium.

The excuse that our Government and our nuclear industry give for continuing to export nuclear reactors under presently inadequate safeguards is that if we do not sell our reactors to nations that want to buy them, other nuclear exporting nations will make the sales—and under safeguards conditions that are less strict than our own.

The terrible irony of all this is that the reactors now being sold by such exporters as France and West Germany in competition with our own reactors are based on designs that American manufacturers originally sold to French and West German manufacturers. The exports of this American nuclear technology had been approved by the old Atomic Energy Commission without requiring, as a condition of the sale, that foreign manufacturers impose strict safeguards on their own reactor exports. The result is that we now find ourselves in an increasingly nuclear-powered world that is governed by old-fashioned nationism and crass commercialism.

Unless something is done— and done quickly—to reverse this trend, the spread of nuclear weapons and the threat of nuclear blackmail may be irreversible.

There are hopeful signs that our Government may, at last, have awakened to the problem. Last fall, Secretary of State Kissinger told the United Nations General Assembly:

"We must take into account that plutonium is an essential ingredient of nuclear explosives and that in the immediate future the amount of plutonium generated by peaceful nuclear reactors will be multiplied many times. Heretofore, the United States and a number of other countries have widely supplied nuclear fuels and other nuclear materials in order to promote the use of nuclear energy for peaceful purposes. This policy cannot continue if it leads to the proliferation of nuclear explosives. Sales of these materials can no longer be treated by anyone as a purely commercial competitive enterprise."

More recently, Fred Ikle, Director of the Arms Control and Disarmament Agency, stated the problem succinctly: The export of peaceful nuclear technology, he said, "provides not only the means, but also the cover," for a spread of nuclear weapons. He also noted:

"Now we suspect that the intent to make nuclear weapons exists in several places even though the capability is not yet there."

Mr. President, the time has come for the nuclear debate to rise above simple name calling. One side calling the other "pronuclear" or "antinuclear" proves nothing and solves nothing. It only causes confusion and anger at a time when we must be clearheaded and calm. The time has come to stop arguing whether nuclear exports are a problem and start taking meaningful action to prevent the problem from getting out of hand.

Mr. President, last year the Government Operations Committee took the first step in that direction by managing the Energy Reorganization Act, which abolished the Atomic Energy Commission and replaced it with two new agencies to separate regulation from promotion of nuclear powers in the United States.

This year, the nuclear provisions of the Export Reorganization Act seek to extend this separation of Federal regulatory and promotional activities to the export of nuclear technology abroad, as well. The transfers contained in the act would place clear authority and vitally needed resources in the Nuclear

Regulatory Commission to establish as rigorous safeguards for nuclear exports as we require for the nuclear technology we use here at home.

Plutonium stolen abroad poses as great a danger to our defense and security, to our health and safety, as plutonium stolen at home. The same holds true for every nation in the world. Therefore, I do not accept the argument that we cannot condition our nuclear sales on strict safeguards because other nuclear exporting nations will not follow our example.

I believe that if the United States exerts world leadership on this momentous issue, other nations will follow. We are still the world leader in nuclear technology; we are still the major supplier of enriched nuclear fuel. Other nations cannot ignore us—yet. But time is running out. Unless we are prepared to live in peril in a world of nuclear disorganization, we must begin to act wisely now.

Next month, more than 100 nations will meet in Geneva the Nuclear Nonproliferation Treaty 5 years after it took effect. I plan to hold a series of hearings beginning April 24 on the nuclear provisions of this act to explore the relationship between nuclear exports and weapons proliferation, and to establish a public record that will be useful to the conference. I have asked Senator GLENN, in recognition of his scientific and technical achievements, to serve as ad hoc chairman of these hearings.

The Government Operations Committee also will soon issue a compendium of reading materials on the issue of nuclear exports and proliferation to provide as complete a record as possible on the legal, technical and policy aspects of the problem.

Mr. President, the world's 185 commercial reactors, now located in 35 nations, have produced a total of 135,000 pounds of plutonium. Most of this plutonium remains inaccessible in highly radioactive spent reactor fuel. By the year 2000, some 100 or more nations will have 2,000 nuclear power reactors, and these reactors will be generating an estimated 2 million pounds of plutonium a year. every year. If every nation by then is permitted to reprocess its own plutonium under safeguards that are no stricter than they are today, then there is little hope that any nation—or any well-armed terrorist group—can be prevented from getting plutonium if it wants it.

Mr. President, the technology can be found in public print today for making a crude nuclear device, capable of killing 100,000 people in a densely populated area, using only about 20 pounds of plutonium. Safeguards will have to be very strict indeed to prevent 20 pounds of plutonium from being diverted from the 2 million pounds that the world's reactors will generate each year.

I urge that we start reorganizing the executive branch to deal with the problem now.

Mr. GLENN. Mr. President, I am pleased to cosponsor the Export Reorganization Act of 1975. In an era of economic plight, it is imperative that we carefully consider our export capabilities and opportunities. The proposed bill will centralize export licensing in the Department of Commerce, thereby reducing time-consuming bureaucratic delays and allowing American businessmen to speedily react to business opportunities abroad.

In addition to enhancing our trade potential, the bill is designed to improve the future peace and safety of all citizens. The dual nature of nuclear power offers mankind new capabilities for both assistance and destruction. It is precisely this unique dual capacity which demands constant vigilance. There is not one difference between the innards of a nuclear weapon and a "peaceful explosive."

The apparent diversion of plutonium by India from a Canadian reactor for a "peaceful" explosion demonstrates exactly the dangers we face. Estimates are that by the year 2000, there may be 2 million pounds of plutonium produced annually. We must do everything in our power to avert the use of this material by terrorists and to protect against the prospect of a world of nuclear armed states turning to violence to resolve differences. With that objective, the bill would restrict the export of nuclear power facilities, materials or information unless the U.S. Nuclear Regulatory Commission determined that safeguards "substantially comparable" to our own domestic procedures exist in the recipient country. Further, the Commission would be directed to examine the safeguards which are currently in force domestically and internationally and to make recommendations for the means to upgrade those found to be deficient.

Mr. President, it is clear to me that the bill we introduce will not remedy all difficulties with respect to exports or avert all risks arising from the technologies involved. Yet if we define our objective in terms of minimizing those risks and difficulties, I believe the bill points the way toward achieving that objective. I congratulate Senators PERCY and RIBICOFF on their work to this end and am grateful and proud to be a part of their effort.

94TH CONGRESS
1ST SESSION

S. 1439

IN THE SENATE OF THE UNITED STATES

APRIL 15, 1975

Mr. PERCY (for himself, Mr. GLENN, and Mr. RIBICOFF) introduced the following bill; which was read twice and referred to the Committee on Government Operations

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A BILL

To reorganize certain export functions of the Federal Government to promote more efficient administration of such functions.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That this Act may be cited as the "Export Reorganization Act of 1975".

STATEMENT OF PURPOSE

SEC. 2. (a) The Congress hereby finds and declares—

(1) that it is in the interest of the economy and effectiveness of the executive branch, and in the interest of the effectiveness of congressional oversight, to reor-

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ganize and centralize certain export licensing functions of the Government in a single agency to which all persons and commercial interests seeking to engage in foreign commerce can apply;

(2) that the Department of Commerce now has the responsibility for providing such a centralized function by issuing most export licenses required by the laws of the United States;

(3) that the Department of State, the Department of the Treasury, the Energy Research and Development Administration, and the Nuclear Regulatory Commission now exercise export licensing and approval authorities that are substantially similar to the authorities now exercised by the Department of Commerce;

(4) that these licensing and approval authorities should be transferred to the Department of Commerce, with appropriate coordination with other agencies to insure that the national interest is protected in the licensing and approval of exports;

(5) that the exporting of nonmilitary nuclear facilities, material, and technology involves special problems related to common defense and security and public health and safety posed by the international proliferation of plutonium and other special nuclear materials, and by

their potential conversion by nations and subnational groups into explosive weapons or dispersal devices;

(6) that the licensing of such exports should be made contingent upon a determination that safeguards against theft, diversion, and sabotage in recipient nations are at least substantially comparable to the safeguards that are required in order to obtain a commercial nuclear license in the United States;

(7) that determinations of safeguards comparability should be made by the Nuclear Regulatory Commission, the agency responsible for protecting common defense and security and public health and safety through the issuance of commercial nuclear licenses in the United States, and

(8) that commercial nuclear exports by the United States should be made in the context of meaningful international controls, and that consideration should be given to the internationalization of all strategically significant aspects of the nonmilitary nuclear fuel cycle.

DEFINITIONS

SEC. 3. As used in this Act, the term—

(1) "atomic energy facility or material for use for nonmilitary purposes" means any production or utilization facility, any special nuclear material, any source

material or any byproduct material as defined in section 11 of the Atomic Energy Act of 1954, to be used for nonmilitary purposes;

(2) "Commission" means the Nuclear Regulatory Commission;

(3) "Department" means the Department of Commerce;

(4) "function" includes power and duty;

(5) "nonmilitary atomic energy technology" means any technology which the Commission determines to relate to atomic energy facilities or materials for use for nonmilitary purposes;

(6) "safeguards" means materials accountability and physical security; and

(7) "Secretary" means the Secretary of Commerce.

TRANSFERS TO THE SECRETARY OF COMMERCE

SEC. 4. (a) (1) There are transferred to the Secretary of Commerce, and the Secretary shall perform, such functions of the Secretary of State under section 414 of the Mutual Security Act of 1954 as relate to the approval for export (including the issuance of export licenses) of arms, ammunition, and the implements of war.

(2) No export license for arms, ammunition, and the implements of war which prior to the effective date of this Act would have been issued by the Secretary of State for

arms, ammunition, and the implements of war may be issued by the Secretary unless the Secretary of State has given written approval for the issuance of such a license.

(b) (1) There are transferred to the Secretary, and the Secretary shall perform, such functions of the Secretary of the Treasury under the Trading With the Enemy Act as relate to the issuance of export licenses.

(2) No export license which prior to the effective date of this Act was issued by the Secretary of the Treasury under the Trading With the Enemy Act may be issued by the Secretary unless the Secretary of the Treasury has given written approval for the issuance of such a license.

(c) (1) There are transferred to the Secretary, and the Secretary shall perform, such functions of the Nuclear Regulatory Commission under sections 53 (a), 62, 82 (c), 103, and 104 of the Atomic Energy Act as relate to the issuance of export licenses for atomic energy facilities or materials for use for nonmilitary purposes.

(2) No export license for atomic energy facilities or materials for use for nonmilitary purposes may be issued after the effective date of this Act unless the provisions of section 7 (a) of this Act are met.

(d) (1) There are transferred to the Secretary, and the Secretary shall perform, such functions of the Administrator of the Energy Research and Development Administration as relate to the approval for export of nonmilitary atomic energy technology.

(2) No approval for export may be given for nonmilitary atomic energy technology after the effective date of this Act, unless the provisions of section 7 (a) of this Act are met.

TRANSFER TO THE SECRETARY OF STATE

SEC. 5. There are transferred to the Secretary of State, and the Secretary shall perform, all functions of the Administrator of the Energy Research and Development Administration relating to the development of international agreements for cooperation on atomic energy facilities or materials for use for nonmilitary purposes and nonmilitary atomic energy technology.

TRANSFERS TO THE NUCLEAR REGULATORY COMMISSION

SEC. 6. (a) There are transferred to the Commission, and the Commission shall perform, such functions of the Administrator of the Energy Research and Development Administration as relate to safeguards for atomic energy facilities or materials for use for nonmilitary purposes and nonmilitary atomic energy technology which are to be exported.

(b) There are transferred to the Commission, and the Commission shall perform, such functions of the Secretary of Transportation under sections 832 and 833 of title 18, United

States Code, that relate to the transportation of radioactive materials.

SAFEGUARDS COMPARABILITY

SEC. 7. (a) No export license for the exportation of atomic energy facilities or materials for use for nonmilitary purposes may be issued by the Secretary, and no approval for the export of nonmilitary atomic energy technology may be given by the Secretary, unless the Commission determines that the recipient country to which any such technology, facility, or material is to be exported has safeguards substantially at least comparable to safeguards required by the Commission in the United States.

(b) The Commission shall establish criteria for use in the development of international agreements for cooperation with foreign countries relating to safeguards with respect to atomic energy facilities or materials for use for nonmilitary purposes and nonmilitary atomic energy technology.

(c) (1) The Commission shall establish and operate a training program to be made available to persons from countries which purchase licensed atomic energy facilities or materials for use for nonmilitary purposes from any person in the United States. Any such program shall include the most advanced techniques and technology for materials accounting and physical security, consistent with national security interests of the United States.

(2) There are authorized to be appropriated such sums as may be necessary to carry out the provisions of this subsection.

NUCLEAR PROLIFERATION ASSESSMENT STATEMENT

SEC. 8. (a) The Commission shall, with respect to each determination pursuant to section 7 (a) involving strategically significant atomic energy facilities or materials for use for nonmilitary purposes and nonmilitary atomic energy technology, prepare and furnish a nuclear proliferation assessment statement to the Arms Control and Disarmament Agency.

(b) In any case of a determination under section 7 (a) to which subsection (a) applies, the Commission shall notify the Arms Control and Disarmament Agency of the proposed approval or license and offer that Agency an opportunity to comment on such approval or license.

SAFEGUARDS STUDY

SEC. 9. (a) (1) The Commission shall conduct a thorough study of the safeguards guidelines and regulations for atomic energy facilities or materials for use for nonmilitary purposes established by the United States and by the International Atomic Energy Agency, with special consideration of the differences in such safeguards.

(2) Not later than nine months from the date of enactment of this Act, the Commission shall prepare and transmit to the President and the Congress a report on the

study required by this subsection, together with such recommendations, including recommendations for the upgrading of such safeguards, as the Commission deems advisable.

(b) (1) The Commission shall conduct a thorough study of the feasibility of internationalization of all strategically significant aspects of the nonmilitary atomic energy fuel cycle.

(2) Not later than nine months from the date of enactment of this Act, the Commission shall prepare and transmit to the President and the Congress a report on the study required by this subsection, together with such recommendations as the Commission deems advisable.

(c) Such sums as may be necessary are hereby authorized to carry out the provisions of this section.

TRANSFER OF PERSONNEL AND PROPERTY

SEC. 10. (a) All personnel, liabilities, contracts, property, and records as are determined by the Director of the Office of Management and Budget to be employed, held, or used primarily in connection with any function transferred under the provisions of this Act, are transferred to the Secretary, to the Secretary of State, or to the Commission, as the case may be.

(b) (1) Except as provided in paragraph (2) of this subsection, personnel engaged in functions transferred under this Act shall be transferred in accordance with applicable laws and regulations relating to transfer of functions.

(2) The transfer of personnel pursuant to subsection (a) shall be without reduction in classification or compensation for one year after such transfer.

SAVINGS PROVISIONS

SEC. 11. (a) All orders, determinations, rules, regulations, permits, contracts, certificates, licenses, and privileges—

(1) which have been issued, made, granted, or allowed to become effective in the exercise of functions which are transferred under this Act, by (A) any agency or office, or part thereof, any functions of which are transferred by this Act, or (B) any court of competent jurisdiction, and

(2) which are in effect at the time this Act takes effect, shall continue in effect according to their terms until modified, terminated, superseded, set aside, or repealed by the Secretary, by the Secretary of State, or by the Commission, as the case may be, or by any court of competent jurisdiction, or by operation of law.

(b) The provisions of this Act shall not affect any proceedings pending at the time this section takes effect before any agency or office, or part thereof, functions of which are transferred by this Act; but such proceedings, to the extent that they relate to functions so transferred, shall be continued before the Department, the Department of State, the Energy Research and Development Administration, or the Commission, as the case may be. Such proceedings, to the extent they do not relate to functions so transferred, shall be continued before the agency or office, or part thereof, before which they were pending at the time of such transfer. In either case orders shall be issued in such proceedings, appeals shall be taken therefrom, and payments shall be made pursuant to such orders, as if this Act had not been enacted; and orders issued in any such proceedings shall continue in effect until modified, terminated, superseded, or repealed by the Secretary, by the Secretary of State, or by the Commission, as the case may be, or by a court of competent jurisdiction, or by operation of law.

(c) (1) Except as provided in paragraph (2)—

(A) the provisions of this Act shall not affect suits commenced prior to the date this section takes effect, and

(B) in all such suits proceedings shall be had, appeals taken, and judgments rendered, in the same manner and effect as if this Act had not been enacted.

No suit, action, or other proceeding commenced by or against any officer in his official capacity as an officer of any agency or office, or part thereof, functions of which are transferred by this Act, shall abate by reason of the enactment of this

Act. No cause of action by or against any agency or office, or part thereof, functions of which are transferred by this Act, or by or against any officer thereof in his official capacity shall abate by reason of the enactment of this Act. Causes of actions, suits, or other proceedings may be asserted by or against the United States or such official of the Department, the Department of State, or the Commission, as may be appropriate and, in any litigation pending when this section takes effect, the court may at any time, on its own motion or that of any party, enter an order which will give effect to the provisions of this subsection.

(2) If before the date on which this Act takes effect, any agency or office, or officer thereof in his official capacity, is a party to a suit, and under this Act—

(A) such agency or office, or any part thereof, is transferred to the Secretary, the Secretary of State, or the Commission, as the case may be, or

(B) any function of such agency, office, or part thereof, or officer is transferred to the Secretary, the Secretary of State, or the Commission, as the case may be,

then such suit shall be continued by the Secretary, the Secretary of State, or the Commission, as the case may be (except in the case of a suit not involving functions transferred to the Secretary, the Secretary of State, or the Commission, as the case may be, in which case the suit shall be continued by the agency, office, or part thereof, or officer which was a party to the suit prior to the effective date of this Act).

(d) With respect to any function transferred by this Act and exercised after the effective date of this Act, reference in any other Federal law to any agency, office, or part thereof, or officer so transferred or functions of which are so transferred shall be deemed to mean the Department, the Department of State, or the Commission, or officer in which such function is vested pursuant to this Act.

(e) Orders and actions of the Secretary, the Secretary of State, or the Commission, as the case may be, in the exercise of functions transferred under this Act shall be subject to judicial review in the same extent and in the same manner as if such orders and actions had been by the agency or office, or part thereof, exercising such functions, immediately preceding their transfer. Any statutory requirements relating to notice, hearings, action upon the record, or administrative review that apply to any function transferred by this Act shall apply to the exercise of such function by the Secretary, the Secretary of State, or the Commission, as the case may be.

(f) In the exercise of the functions transferred under this Act, the Secretary, the Secretary of State, or the Commission, as the case may be, shall have the same authority as that vested in the agency or office, or part thereof, exercising such functions immediately preceding their transfer, and his actions in exercising such functions shall have the same force and effect as when exercised by such agency or office, or part thereof.

EFFECTIVE DATE

SEC. 12. This Act, other than this section, shall take effect ninety days after the date of enactment of this Act, or on such prior date after enactment of this Act as the President shall prescribe and publish in the Federal Register.

STATEMENT BY HONORABLE CHARLES C. DIGGS, JR.
SUBMITTED FOR THE RECORD BEFORE THE
SENATE GOVERNMENT OPERATIONS COMMITTEE
HEARINGS ON THE EXPORT REORGANIZATION ACT OF 1975

I appreciate the opportunity to present this statement for the Committee's consideration as it reviews United States policy with respect to the export of nuclear technology. The essential idea behind this statement is embodied in a bill I have introduced in the Congress which would prohibit the sale or exchange of nuclear materials or technology to any country which has not ratified the Treaty on the Non-Proliferation of Nuclear Weapons (NPT).

The prevention of a nuclear war is one of the most crucial objectives facing our world today. An important part of the effort to avoid nuclear war is stopping the spread of nuclear weapons to additional countries, which is the principal purpose behind the NPT.

The major arguments supporting this proposed export prohibition are the following:

(1) The countries which have not ratified the NPT are not fully and comprehensively covered by the International Atomic Energy Agency (IAEA) safeguards, whose stated purpose is the timely detection of diversion of significant quantities of nuclear materials from peaceful to military uses and deterrence of such diversion by the risk of early detection. Under Article III of the NPT, all non-nuclear weapon countries party to the Treaty agree to accept IAEA

safeguards on all nuclear materials in all peaceful nuclear activities within its territory. However, as to countries not party to the NPT, IAEA safeguards apply only to the particular materials being transferred.

My colleague, Mr. Aspin of Wisconsin, recently revealed that the U. S. Nuclear Regulatory Commission authorized the sale of 97 pounds of highly enriched uranium to South Africa over the past year. Pursuant to the bilateral United States/South African Civil Nuclear Assistance Agreement, IAEA safeguards apply to these uranium shipments.

In April of this year, Prime Minister John Vorster announced the success of South Africa's own uranium enrichment pilot plant at Valindaba. Since South Africa is not a party to the NPT, and therefore not subject to the comprehensive and complete safeguard coverage required by Article III, the uranium enrichment facility as well as other nuclear facilities indigenous to South Africa are not subject to any external safeguard coverage. This means, in fact, that South Africa has the option to divert its nuclear materials to military use at its own discretion. The possibility of this outcome is based on the fact that there is no explicit requirement in the U. S./South African bilateral agreement that spent fuel be reprocessed outside South Africa. (Article VIII, sec. G of the bilateral agreement, as amended May 22, 1974, states only that "... such reprocessing or alteration shall be performed in facilities acceptable to both Parties....")

(2) The second argument supporting this proposal is that the continued supply of nuclear assistance to countries which are not parties to the NPT serves as a disincentive for joining the NPT. In other words, since the United States provides nuclear assistance to countries, whether or not party to the NPT, it therefore makes little difference to a country whether or not it signs and ratifies the Treaty. In short, there is presently no penalty for being outside the NPT and the IAEA system nor a real incentive to join. Furthermore, non-weapon countries which have accepted IAEA safeguards on their entire civilian nuclear program are discriminated against. Nevertheless, the U.S. continues to profess its policy of encouraging widespread adherence to the NPT -- a policy which was most recently reaffirmed by Dr. Fred Ikle, Director of the Arms Control and Disarmament Agency and Chief U.S. Representative to the NPT Review Conference, currently in session in ~~Vienna~~ Geneva.

Notwithstanding any economic arguments of the importance of nuclear trade to U.S. balance of payments, and that non-parties to the NPT might obtain assistance from other non-party suppliers, this still does not justify the U.S., or any party, in compromising the non-proliferation principle and therefore facilitating Treaty abstention. The U.S. must assume the leadership role in deed as well as word.

(3) The third argument in support of this proposal is that the U.S., as a matter of policy, should not actively assist countries which have the technical capability to build a nuclear bomb, the political/military incentive to build a bomb, but have not even indicated willingness or intent to sign and ratify the NPT.

Countries which do not intend to pursue the course of nuclear weapons development, even where the capability is present, have taken clear political action to indicate such by either signing or ratifying the NPT.

I have been particularly concerned about South Africa's growing nuclear capability and its possible implications for contributing to tensions in Southern Africa. Recent events have confirmed observations of South Africa's ability to eventually become totally self-sufficient in its nuclear program. The success of the uranium enrichment plant is one instance. In addition, it is expected, although not yet confirmed, that South Africa is about to undertake construction of a full-scale chemical separation plant. Further, it is well known that South Africa possesses an abundant supply of its own uranium ore, from which nuclear fuel is fabricated. These factors, together with apparent U. S. willingness to provide nuclear reactors, combine to enable South Africa to produce all the nuclear bombs it wants. The United States should not and must not be connected with this effort in any respect.

Nevertheless, there is presently under consideration a $12 million agreement between South Africa's Escom, Inc. and the U.S. Energy Research and Development Administration (Erda) for enriched nuclear fuel to power South Africa's first 1000 megawatt nuclear power reactor. Further, the Export-Import Bank is considering guaranteeing a loan to General Electric for the purchase of the reactors, whose total value is $227 million.

Given South Africa's probable inclination towards nuclear weapons development, and given that these transactions would directly facilitate such efforts, the essential rationale behind the U.S. arms embargo against South Africa is equally applicable here. That is, in order to contribute to a peaceful solution to the problems of Southern Africa and to avoid any steps which might at this point directly contribute to international friction in the area, the U.S. should cease its nuclear assistance to South Africa.

Never more than at the present time of change in Southern Africa, has South Africa been faced with such a challenge to its domestic racial order, particularly in the aftermath of the Portuguese collapse in Angola and Mozambique. The collapse of Portuguese colonialism has stripped away South Africa's buffer-clients in these areas, exposing it more directly to independent Black Africa, which opposes South Africa's apartheid system and its continued dominance in the Southern African region. These factors increase the pressure and international isolation of South Africa. Observers have long speculated that if South Africa's military position became serious enough, the government would switch to nuclear defense.

South Africa's growing nuclear potential is further confirmed by London's highly regarded Institute for Strategic Studies, which recently rated South Africa as a "Nuclear Threshold Power" with capability of nuclear weapons production in three years.

In the event of a deteriorating situation in these areas, thus raising tensions throughout Southern Africa, and involving the independent African states, it is not inconceivable that Pretoria might employ Nuclear Blackmail aimed at intimidating hostile Black-ruled neighbors. The use of Nuclear Blackmail by South Africa against Black African states would almost certainly raise international tensions of such a nature that might invite external intervention by Superpowers and possibly risk revival of Cold War confrontation.

The overriding instability in Southern Africa,notwithstanding efforts at "detente" by South Africa, means that the United States should not in any way contribute to the development of Pretoria's military technology, and thus create a factor for further instability in this troubled region. In the absence of signing the NPT, the United States should not supply South Africa or any other non-signatory state with enriched uranium which could only accelerate its development from a "Nuclear Threshold Power" into a genuine nuclear power which might use its capability to bring into being a full-scale international crisis.

WAR CONTROL PLANNDRS, INC.,
Washington, D.C., April 24, 1975.

Hon. ABRAHAM A. RIBICOFF,
Chairman, Government Operations Committee,
U.S. Senate,
Washington, D.C.

DEAR MR. CHAIRMAN: At today's Hearing several Committee Members agreed with one witness who observed that when American official representatives work with the representatives of other nations in international institutions like the International Atomic Agency and other international instrumentalities, it always became apparent that the representatives of other nations came into the session with a clearcut long range national objective and strategy. * * * while in contrast the American representative had had no orientation to a coherent and constant U.S. global objective and strategy.

"Sound national security interests and objectives are the keys to effective strategies. For most of the past decade, this posed some awkward problems in the United States and since no interests or objectives were formally recorded by the Executive Branch during either the Kennedy or Johnson Administrations. As a result, strategists in the Departments of State and Defense, and in the Joint Chiefs of Staff, were compelled to identify, interpret, and contrive their own lists from National Security Action Memorandums, private and public pronouncements of the President, and from speeches, presentations to Congress, and individual statements by other influential officials in the U.S. government. That 'do-it-yourself' system was seldom satisfactory, since it depended on too many conflicting or ambiguous utterances which were subject to irreconcilable interpretations, and thus were rendered almost meaningless by compromise." From Chapter 10 of the book GRAND STRATEGY: Principles and Practices by Col. John M. Collins of the Congressional Research Service, published by the Naval Institute Press. (It should be added that the same vacuum of Congressional and public ignorance of the true world objectives of U.S. strategic power has continued and intensified under Presidents Nixon and Ford.)

The present series of Hearings will be quite inconclusive because each witness testifies from his or her own basic assumptions of what the U.S. strategic objectives are, and for what purpose a generation of American citizens have been required to suffer, sacrifice and die.

For a generation White House global objectives and strategy have been controlled by special interests dealing directly with the White House top-secret command sanctuary through private contacts * * * ignoring the elected Congress, the press and the American people. There are special interests which have found escalating personal wealth or position or power from the escalating national danger of the ever-escalating Kremlin/White House race to produce the global technologies of strategic power.

These special interests, more familiar with their own private goals than with the needs of the American people, have mismanaged their control over the sovereign power of the American people in world affairs,until the American people today have been led toward approaching American tragedy and chaos.

In today's Hearing Senator Percy mentioned that for twenty years the Senate Foreign Relations Committee had never held a single Hearing on this subject. The problem is even more threatening than this, because there is no Committee in the Senate or the House which has the authority or the jurisdiction to stand eyeball-to-eyeball with the President * * * on a level above that of the National Security Advisor in the White House and the Secretary of State * * * to open up a historic pro and con and creative professional and public and political agonizing reappraisal of U.S. world objectives and the imperative for new organizational structures within the Executive Branch and within the Congress that the control of U.S. world objectives can be brought back into the hands of responsible elected government, and out of the hands of private interests.

It may be that your Committee can open the creative discussion of the inadequacy of the present organization of the Executive Branch. It is dangerous to oversimplify approaching megacrisis which by far is more complex and difficult than any problem civilization ever has faced * * * but the following oversimplifications are offered in case you wish to use them to spark pro and con and expansive discussion from many sources.

NEW-DIMENSION PURPOSES FOR NEW-DIMENSION POWERS

The primary concern of today's testimony was in the area of the inadequacy fo U.S. management controls for the export of so-called "peaceful" nuclear capabilities and materials.

After a generation of forced research and development and production in the field of catastrophic nuclear weapons and global delivery systems, today for the first time in history the men in the Kremlin secret command center and the men in the White House secret command center hold the power to destroy humanity * * * a power the mythologies had always claimed that GOD alone could command!

There are no precedents in scholarly military strategy, political science, social science, international law, just war theology or pacifism for today's new power realities as men in secret Kremlin offices and men in secret White House offices stalk the Earth wielding GOD-seized power of death for humanity * * * caught in a self-generating arms race now increasing at increasing rates.

In the mythology of most world religions GOD-seized power means simultaneously (1) the power to destroy humanity *in vengence*, in the twinkling of an eye, in one hand and in the other hand (2) the *compassionate power* to protect and enrich Life for humankind on the planet below.

In the National Security Council and Staff the President has a superior command and staff assistance in wielding the power to destroy humanity *in vengence* * * * in the twinkling of a nuclear war.

Tragically, it never again will be possible to regain the sinking national security of the United States by endless escalation of, and use of or threatened use of this power to annihilate world civilizations.

The top-of-the-line U.S. strategic weapons have become suicide weapons. The International Institute for Strategic Studies (London) in its publication *THE MILITARY BALANCE 1972-1973* comes to the scholarly conclusion that the arms race has passed the point where now, the superpower which may initiate nuclear war *for any reason*, itself will be obliterated in the ensuing holocaust.

Our enemies obviously have been confident for some time that the U.S. President would not dare *push the button* for threatened nuclear war whether as first strike, or second strike, or counter force, or the new-fangled retargeting or retaliation or any other press conference cliche * * * because in doing so he will destroy the Constitution of the United States which he and all members of the U.S. Armed Forces swore an Oath to defend.

Even if the 94th Congress should suddenly DOUBLE to pending Defense Budget, the Pentagon no longer can *STOP* the relentless expansion of world powers hostile to America, by escalating threats to commit national suicide in nuclear war.

This relentless expansion of world powers hostile to America can only be *TOPPED* by a larger strategic vision, a more noble commitment of American creativity and power, a New American Purpose in world crisis.

Nowhere in the executive branch of the Congress is there a supreme council releasing the creativity and power of the American people to pioneer the research and development and testing of global compassionate power systems * * * Life support systems for planet earth * * * Civilized world institutions to guard the security and progress of the people of *all* nations (as Air Traffic Control guards the safety of ALL passengers of ALL airplanes in a cloud).

EXPORTING THE POWER TO DEFEAT AMERICA

The Bill you are considering would establish a single export licensing agency in the Government. Consider the following problem which would face this new agency its first day of operation :—

Since Kremlin aerospace/nuclear power matches American aerospace nuclear powers of destruction to the point where the U.S. dares not use its top-of-the-line weapons * * * as the American Giant becomes paralyzed as he reaches for the trigger of the ultimate power to exterminate humanity * * * the Kremlin strategists have been liberated for relentless forward expansion along the lines of their basic global strategy :—

As the Thirteen Original Colonies formed the United States and then moved relentlessly Westward in defensive expansion * * * killing off Indians and Frenchmen and Mexicans and other potential threats * * * until we found a *sense of security* by strategic domination of the North American Continent. * * * similarly for hundreds of years under Tzars and Commissars, Russia has expanded from defensive expansion reaching outward to overpower threatening nations, in search for a *sense of security* from dominion over a far larger Supercontinent.

In the Thirteenth Century the Mongols killed 18,000,000 Chinese in ten years using only primitive weapons and primitive transportation.

It is traditional Russian grand strategy to expand slowly (using most primitive weapons or most modern weaponry * * * using most primitive transportation or most modern land, sea and air transport * * * using external diplomatic pressures and internal political pressures on each succeeding country) to gain eventual dominion over the Supercontinent (Europe/Asia/Africa).

He who gains dominion over the Supercontinent will then command the energies & resources, the transportation channels, the production facilities, the manpower, the political structures to maintain strategic domination over Planet Earth.

To accomplish this Kremlin long range grand strategy does not require invading the United States, or overthrowing the Washington Government by force, or igniting the global holocaust by dropping hydrogen-headed missiles on the U.S.

The United States, not being self-sufficient, and depending upon the rest of the world for energies and resources to maintain American strategic power, will gradually shrink back from poverty to impotence to defeat, without a shot having to be fired at an American.

(At this point someone always says "but what about the Chinese?". There are two long range possibilities:—(1) The Chinese masses and the Russian masses may fight each other down to the primitive levels of Mongol warfare as they interface with each other in their own race toward dominion over the Supercontinent, on the one hand or on the other hand (2) in the next few months or years as leadership in the Soviet Union and China change, these two giants may join arm in arm to move irresistably and promptly across the Supercontinent and dominion over Planet Earth.)

White House strategists will try to hold on to the one option:—pushing the button for the final obliterating world holocaust and the destruction of world civilization in the name of national defense.

As the American people sink into this fatal strategic trap, the special interests who have private access to the White House command sanctuary, have found vast sources of further private wealth from helping the Kremlin strategists in their long, long range plans for strategic expansion across the Supercontinent.

Soviet strategists overinvested in strategic power and underinvested in production of wheat several years ago. The Kremlin faced internal disorder. The powerful American private interests made fortunes for themselves selling wheat to the Kremlin, raising the price of living in America, and allowing the Kremlin to get by with its overinvestment in strategic power. Would the proposed Export Licensing Agency have approved?

Other powerful private American interests are finding great personal wealth building a chain of nitrogen fertilizer factories (which can be transformed to produce nitrogen for ammunition) for the Kremlin . . . other private interests are helping the Kremlin build a chain of truck factories (which can be transformed to produce tanks) . . . other private interests are finding great profits from helping the Kremlin make up lost time in developing sophisticated computer capabilities, and complex production capabilities (also essential for the long, long range Kremlin plans) to expand strategic dominion across the Supercontinent (Europe/Asia/Africa).

Other private power American interests are seeking personal fortunes helping the Kremlin explore and exploit the fabulous underground gas and oil and other natural resources of Siberia, as part of the Kremlin grand strategy for dominion over the Supercontinent and therefore dominion over world civilizations.

Would the proposed export licensing agency encourage this export of American strategic capabilities to help Kremlin and other strategists hostile to America?

When the Kremlin expanded with ugly and raw force a generation ago, the American people were aroused and determined to "contain" this crude expansion, using the threat of American aerospace/nuclear power.

The Kremlin strategists matched U.S. aerospace/nuclear power to the extent that the top-of-the-line U.S. strategic weapons have been paralyzed. If we use them, we destroy ourselves.

Then Kremlin strategists projected the mystique of "detente" which did two important things:—(1) it calmed the American determination to "contain" Kremlin expansion, and (2) it won the support of the top financial interests in America who found private profit backing the enemy of America, and who also had the private access to the White House control of foreign policy.

Would the creation of a single export licensing agency in any way clarify the hidden and deceptive real objectives of U.S. global power strategy?

THE STRATEGIC CHOICE BEFORE THE CONGRESS AS REPRESENTATIVES OF THE AMERICAN PEOPLE

Long, long range there are three alternative future for humanity . . .

First alternative future.—There will be world order in which all nations have become political satellites under the shadow of Kremlin global strategic power (as with Czechoslovakia today). The people of all nations will be in continuous rebellion against the Soviet people. The Soviet people will be pauperized to maintain the global strategic enforcement power.

Second alternative future.—There will be world order in which all nations have become economic subsidiaries under the shadow of White House global strategic power (as with Canada today). The people of all nations will be in continuous rebellion against the American people. The American people will be pauperized to maintain the global strategic enforcement power.

Third alternative future.—There will be world order in which all nations find security and independence and fair access to the energies and resources and know-how to provide the necessities of life for their people. There will be war no more among the nation, and the scarce energies and resources of the Earth can be directed toward production of food, clothing, housing clean air & water, health, education and security for all people.

The communist international elite controlling Kremlin objectives tilt toward the *first alternative future.* The financial international elite controlling White House objectives tilt toward the *second alternative future.*

Humanity as a whole has not attached its support to either Kremlin or White House side of the runaway arms race. But great tidalwaves of human relief and renewed hope for Life may sweep world populations in support of U.S. world statemanship if Congress speaking for the American people would enlarge U.S. strategic objectives to the great new vision of the *third alternative future.* Once again it might be a matter of pride to be an American, helping humanity find ways to live through approaching crises, rather than threatening the extermination of human life as a matter of foreign policy.

(Rev.) HOWARD KURTZ,
HARRIET KURTZ.

[From the Congressional Record—Senate, Thursday, April 17, 1975]

U.S. EXPORT OF NUCLEAR TECHNOLOGY

Mr. PASTORE. Mr. President, for the information of the Members of this body and the public, I would like, at this time, to briefly review the background and status of U.S. export of nuclear technology to other nations.

It is timely that this be done in view of the suggestions made by some that the United States no longer export nuclear technology for peaceful purposes. History and the hard facts show beyond any reasonable doubt how completely mistaken this course would be.

It would only result in two things—neither of which is desired—less effective international safeguards for the control of the peaceful atom and greater deficits in our balance of payments.

American export of nuclear technology had its origin in President Eisenhower's famous speech at the United Nations in 1953 advocating atoms for peace. The atoms for peace program had two major purposes. First was the humanitarian desire to share with other nations the benefits of the civilian applications of nuclear energy and the second—and perhaps more important—purpose was to reduce the likelihood of the spread of nuclear weapons to other nations.

Since then, every step of the way in the development of the peaceful atom has been marked by American initiative designed both to deal with the desire of many nations to share the benefits of peaceful nuclear technology and to control the diversion of that technology to other than peaceful purposes.

Starting as far back at 1955, it was my privilege to be selected as a delegate to the U.S. mission to the 10th General Assembly of the United Nations. It was also my privilege to advance, on behalf of the U.S. Government before the first political committee, the draft resolution that led to the creation of the International Atomic Energy Agency.

Today more than 100 nations of the world are members of this International Agency. Among the tasks entrusted to this Agency is the administration of international safeguards to assure that atoms for peace are not diverted to atoms for war.

Over the years, the International Atomic Energy Agency has been working assiduously to provide and promulgate safeguard regulations to assure that any of the fuel for nuclear reactors would not be diverted from peaceful uses into themanufacture of nuclear explosives or weapons.

It is my understanding that up to this day there has not been a single violation in the case of any nuclear fuel provided under any of the agreements for cooperation for peaceful nuclear purposes entered into by the United States of America with various foreign governments of the world.

While we can and should be proud of this record, we must strive to insure that the international safeguards are continually reviewed and strengthened to deal with expanding nuclear trade.

Last year, India exploded a nuclear device, purportedly intended for peaceful applications. India gained the dubious distinction as the latest member of the so-called "nuclear club" not through circumvention of international safeguards, but because they possessed a reactor which was furnished by the Canadian Government and not subject to international safeguards.

I have always been a firm supporter of measures to prevent the international proliferation of nuclear weapons. In 1966, I introduced the first Senate resolution supporting the nuclear Non-Proliferation Treaty. That resolution passed the Senate by a vote of 80-0.

I remain—and always will remain—firmly convinced that every possible measure must be taken to prevent the diversion of nuclear materials given for peaceful purposes to weapons production. And it was for this precise reason that strict safeguard procedures were promulgated by the International Atomic Energy Agency.

An article appeared in the April 14 edition of the Washington Post which suggests that the shipment of a certain amount of highly enriched uranium to the Republic of South Africa for use in a research reactor located there could lead to the development of nuclear weapons by that nation.

The thrust of the article seemed to be that the United States should discontinue its export of nuclear materials in the interest of preventing further proliferation of nuclear weapons. Realistically, in today's world, if we never export another kilogram of uranium, this, in and of itself, would not prevent the proliferation of nuclear weapons.

Indeed, the removal of the historical American initiatives for international safeguards control might lead to a weakening of those controls. The United States has been the prime mover in developing international controls in the form of safeguards over transfers of nuclear equipment and materials from one nation to another. We could no longer take a lead role in these critical and sensitive diplomatic agreements involving the affairs of other soverign states if we ruled ourselves out of further international nuclear trade.

The list of other nations with fully developed nuclear industries who are actively exporting nuclear technology grows year by year. Already it includes Russia, Great Britain, France, Canada, West Germany, Japan, and Sweden.

The withdrawal of the United States from this market would only serve as a bonanza for our competitors who would leap to fill the economic gap created by our decision.

The growth of nuclear technology is here to stay and its growth cannot be stopped. The physical basis is familiar to scientists worldwide. A dozen or more nations have the technological capability and industrial base for the development of civilian atomic power or nuclear weapons.

South Africa has copious supplies of uranium. On April 7 of this year it announced that a new pilot plant for the enrichment of uranium was in partial operation.

Thus, it would appear that if South Africa was of the mind to fabricate a bomb, it could certainly do so with its own resources and without our help. Thus a call for an end to U.S. nuclear exports would be most inadvisable. The world would go on its way without us.

The best we can hope for is to develop the beneficial applications and strictly control the harmful and destructive aspects.

The world will have the peaceful atom. If we are to exert any influence in order to prevent more of the world from becoming members of the "nuclear club" we must continue our leadership on the international atomic scene.

I ask unanimous consent that a list of such agreements and related material be printed in the RECORD.

There being no objection, the material was ordered to be printed in the RECORD, as follows:

AGREEMENTS FOR COOPERATION IN THE CIVIL USES OF ATOMIC ENERGY

	Scope	Effective date	Termination date
A. BILATERALS WITH INDIVIDUAL COUNTRIES			
Country:			
Argentina	Research and power	July 25, 1969	July 24, 1999
Australia	do	May 28, 1957	May 27, 1997
Austria	do	Jan. 24, 1970	Jan. 23, 2014
Brazil	do	Sept. 20, 1972	Sept. 19, 2002
Canada	do	July 21, 1955	July 13, 1980
China, Republic of	do	June 22, 1972	June 21, 2014
Colombia	Research	Mar. 29, 1963	Mar. 28, 1977
Finland	Research and power	July 7, 1970	July 6, 2000
Greece [1]	Research	Aug. 4, 1955	Aug. 3, 1974
India	Power (Tarapur)	Oct. 25, 1963	Oct. 24, 1993
Indonesia	Research	Sept. 21, 1960	Sept. 20, 1980
Iran	do	Apr. 27, 1957	Apr. 26, 1979
Ireland	do	July 9, 1958	July 8, 1978
Israel	do	July 12, 1955	Apr. 11, 1977
Italy	Research and power	Apr. 15, 1958	Apr. 14, 1978
Japan	do	July 10, 1968	July 9, 2003
Korea	do	Mar. 19, 1973	Mar. 18, 2014
Norway	do	June 8, 1967	June 7, 1997
Philippines	do	July 19, 1968	July 18, 1998
Portugal	do	June 26, 1974	June 25, 2014
South Africa	do	Aug. 22, 1957	Aug. 27, 2007
Spain	do	June 28, 1974	June 27, 2014
Sweden	do	Sept. 15, 1966	Sept. 14, 1996
Switzerland	do	Aug. 8, 1966	Aug. 7, 1996
Thailand	do	June 27, 1974	June 26, 2014
Turkey	Research	June 10, 1955	June 9, 1981
United Kingdom	Research and power	July 21, 1955	July 20, 1976
Do	Power	July 15, 1966	July 14, 1976
Venezuela	Research and power	Feb. 9, 1960	Feb. 8, 1980
Vietnam, Republic of	Research	July 1, 1959	June 30, 1979
B. BILATERALS WITH INTERNATIONAL ORGANIZATIONS			
Organization:			
European atomic energy community (EURATOM).	Joint nuclear power porgram	Feb. 18, 1959	Dec. 31, 1985
EURATOM	Additional agreement to joint nuclear power program.	July 25, 1960	Dec. 31, 1995
International Atomic Energy Agency (IAEA).	Supply of materials, etc	Aug. 7, 1959	Aug. 6, 2014
INTERNATIONAL AGREEMENTS			
1. Special arrangements:			
United States-U.S.S.R	Agreement on scientific and technical cooperation for the peaceful uses of atomic energy.	June 21, 1973	June 20, 1983
United States-Romania	Memorandum on cooperation in peaceful uses of atomic energy.	Jan. 1, 1973	[2]

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[1] Superseding, research and power agreement in abeyance; U.S. material covered by IAEA (NPT) safeguards.

[2] Remains in effect until representatives of the USERDA and Government of Romania have the opportunity to discuss a renewal of the memoranda.

UNITED STATES-IAEA TRILATERAL SAFEGUARDS AGREEMENTS FOR APPLICATION OF IAEA SAFEGUARDS TO U.S.-SUPPLIED MATERIALS

3d party	Effective date	Termination date [1]
Argentina	July 25, 1969	AC.
Australia (suspended July 10, 1974) [2]	Sept. 26, 1966	AC.
Austria (suspended July 23, 1972)	Jan. 24, 1970	AC.
Brazil (amended Sept. 20, 1972)	Oct. 31, 1968	AC.
China, Republic of	Dec. 6, 1971	AC.
Colombia	Dec. 9, 1970	AC.
Denmark (suspended Mar. 1, 1972) [1]	Feb. 29, 1968	AC.
India	Jan. 27, 1971	AC.
Indonesia	Dec. 6, 1967	AC.
Iran (suspended May 15, 1974) [1]	Aug. 20, 1969	AC.
Israel	June 15, 1966	Apr. 4, 1975.
Japan	July 10, 1968	AC.
Korea (amended Mar. 19, 1973)	Jan. 5, 1968	AC.
Philippines (suspended Oct. 16, 1974) [2]	July 19, 1968	AC.
Portugal	July 19, 1969	AC.
South Africa (amended June 28, 1974)	July 26, 1967	AC.
Spain (amended June 28, 1974)	Dec. 9, 1966	AC.
Sweden	Mar. 1, 1972	AC.
Switzerland	Feb. 28, 1972	AC.
Turkey	June 5, 1969	AC.
Venezuela	Mar. 27, 1968	AC.

[1] AC indicates termination on same date as agreement for cooperation.

[2] Suspended in view of NPT safeguards agreements with IAEA.

NON-PROLIFERATION TREATY AND SAFEGUARDS STATUS OF COUNTRIES WITH WHICH THE UNITED STATES HAS AGREEMENTS FOR COOPERATION

Country	NPT status	Safeguards
1. Argentina		IAEA trilateral.
2. Australia	Ratified	IAEA–NPT.
3. Austria	do	Do.
4. Brazil		IAEA Trilateral.
5. Canada	Ratified	IAEA–NPT.
6. China (Republic of) [1]	do	IAEA Trilateral.
7. Colombia	Signed, but not ratified	Do.
8. Denmark	Ratified	IAEA–NPT.
9. Finland	do	Do.
10, Greece	do	Do.
11. India		IAEA Trilateral.
12. Indonesia	Signed, but not ratified	Do.
13. Ireland	Ratified	IAEA–NPT.
14. Iran	do	Do.
15. Israel		IAEA Trilateral.
16. Japan	Signed, but not ratified	Do.
17. Korea	Ratified	Do.
18. Norway	do	IAEA–NPT.
19. Philippines	do	Do.
20. Portugal		IAEA Trilateral.
21. South Africa		Do.
22. Spain		Do.
23. Sweden [2]	Ratified	Do.
24. Switzerland	Signed, but not ratified	Do.
25. Thailand	Ratified	IAEA–NPT.
26. Turkey	Signed, but not ratified	IAEA Trilateral.
27. Venezuela	do	Do.
28. Viet-Nam	Ratified	IAEA–NPT.
29. United Kingdom [3]		

[1] An NPT safeguards agreement has not been concluded between the IAEA and ROC as a result of the ROC's expulsion from the IAEA in December 1971. The IAEA trilateral safeguards agreement, however, is still in effect and being implemented.

[2] Negotiation of an NPT safeguards agreement is underway with the IAEA.

[3] The United States/United Kingdom agreement for Cooperation in the power reactor field envisages the application of IAEA safeguards on any enriched fuel provided by the United States. No such material has been provided to date.

Note.—In addition to the above, the Euratom states (Belgium, Federal Republic of Germany, Italy, Luxembourg, and the Netherlands) are in the process of ratifying the NPT, following which the IAEA/Euratom safeguards agreement will come into force. In the meantime, Euratom safeguards apply. France, which is not an NPT, party, will continue to be subject to Euratom safeguards insofar as United States-supplied materials and equipment are concerned.

U.S.-TYPE NUCLEAR POWERPLANTS ABROAD [1] OPERATING, IN CONSTRUCTION OR ON ORDER, AS OF JUNE 1, 1974

[Megawatts electrical]

Country and plant	In operation	In construction or on order	NSSS supplier
Austria: Tulln		700	KWU.
Belgium:			
Tihange		870	ACLF Group.
Doel-1		390	ACEO.
Doel-2		390	ACECO.
Doel-3		900	FRAM/ACECO.
Tihange-2		900	FRAM/ACECO.
Finland:			
Lovisa-1		440	U.S.S.R.
Lovisa-2		440	U.S.S.R.
Finland-3		600	ASEA.
Finland-4		600	ASEA.
Olkiluoto		660	ASEA Atom.
France:			
Sena	266		ACEO/FRA/W.
Fessenheim-1		890	Framatome.[2]
Fessenheim-2		890	Do.
Bugey-2		925	Do.
Bugey-3		925	Do.
Bugey-4		925	Do.
Bugey-5		925	Do.
Gravelines B1		925	Do.
Gravelines B2		925	Do.
Gravelines B3		925	Do.
Gravelines B4		925	Do.
Tricastin-1		925	Do.
Tricastin-2		925	Do.
Tricastin-3		925	Do.
Tricastin-4		925	Do.
St. Laurent-3		971	ALST/SOGERCA.[3]
St. Laurent-4		971	ALST/SOGERCA.[3]
Caux-1		750	Framatome.
Caux-2		750	Do.
Cuax-3		750	Do.
Cuax-4		750	Do.
Hanquedoc-1		1,000	Do.
Hanquedoc-2		1,000	Do.
Hanquedoc-3		1,200	Do.
Hanquedoc-4		1,200	Do.
AMBES-1		1,200	Do.
AMBES-2		1,200	Do.
AMBES-3		1,200	Do.
AMBES-4		1,200	Do.
Dampierre-1		905	Do.
Dampierre-2		905	Do.
Dampierre-3		905	Do.
Dampierre-4		905	Do.
Germany:			
KRB	237		GE.
KWL Lingen	256		AEG.
KWO Obrigheim	328		Siemens.
KKS Stade	630		Do.
KKW Wuergassen	612		KWU.
Biblis-1		1,150	KWU.
Biblis-2		1,240	KWU.
Brunsbuettel		770	KWU.
KKP Philipsburg-1		864	KWU.
KKP Philipsburg-2		864	KWU.
Unterweser		1,230	KWU.
Nordenham		1,300	KWU.
Neckarwestheim-1		762	KWU.
KKI Isar		870	KWU.
Muelheim-Kaerlich		1,215	BBC-BBR.
Kruemmel		1,260	KWU.
WYHL-SUD-KWS-1		1,250	KWU.
WYHL-SUD-KWS-2		1,250	KWU.
GKN Neckarwestheim-2		1,300	KWU.
Dettingen		1,200	KWU.
BWAG-1—Grafenrheinfeld		1,300	KWU.
BWAG-2		1,300	KWU.
BWAG-3		1,300	KWU.
Gundremmingen-2		1,250	KWU.
Gundremmingen-3		1,250	KWU.
Grohnde/Oberweser		1,300	KWU.
RWE-6		1,240	KWU.
RWE-7		1,240	KWU.
RWE-8		1,240	KWU.
RWE-9		1,240	KWU.
RWE-10		1,240	KWU.
RWE-11		1,240	KWU.
VEW-A		1,240	KWU.
VEW-B		1,200	KWU.

See footnote at end of table.

U.S.-TYPE NUCLEAR POWERPLANTS ABROAD[1] OPERATING, IN CONSTRUCTION OR ON ORDER, AS OF JUNE 1, 1974 —Continued

[Megawatts electrical]

Country and plant	In operation	In construction or on order	NSSS supplier
Iran:			
Iran-1		1,200	KWU.
Iran-2		1,200	KWU.
Iran-3		900	Framatome.
Iran-4		900	Do.
Italy:			
SENN	150		GE.[4]
SELNI	247		W.[5]
ENEL-4		783	AMN-GETSCO.
ENEL-5		952	ENI.
ENEL-6		982	AMN.
ENEL-8		982	GE.
Netherlands: Borselle	450		KWU.
Spain:			
Zorita-1	153		W.
Nuclenor	460		GE.
Lemoniz-1		902	W.
Lemoniz-2		902	W.
Almaraz-1		902	W.
Almaraz-2		902	W.
ASCO-1		902	W.
ASCO-2		902	W.
Cofrente		902	W.
No name yet		974	GE.
Switzerland:			
Beznau-1	350		W/BB.
Beznau-2	350		W/BBC.
Muhleberg	306		GETSCO/BB.
Kaiseraugst		850	GE/Sogerca.
Leibstadt		850	GETSCO/BB.
Gosgen		1,100	KWU.
Graben		1,140	BBC/GE.
Brazil: Angra-1		626	W.
Mexico:			
Laguna Verde-1		600	GE.
Laguna Verde-2		600	GE.
Sweden:			
Oskarshamn-1	440		ASEA.
Oskarshamn-2		580	ASEA.
Ringhals-1		760	ASEA.
Ringhals-2		900	W/Monitor.
Ringhals-3		900	W.
Ringhals-4		900	W.
Barseback-1		580	ASEA.
Barseback-2		580	ASEA.
Forsmark-1		900	ASEA.
Forsmark-2		900	ASEA.
Oscarshamn-3		900	ASEA.
Japan:			
Tsuruga	340		GE.
Mihama-1	320		W.
Mihama-2	470		MAPI.
Mihama-3		781	MHI.
Fukushima-1	460		GE.
Fukushima-2		784	GE/Toshiba.
Fukushima-3		784	Toshiba.
Fukushima-4		784	Hitachi.
Fukushima-5		784	Toshiba.
Fukushima-6		1,100	GE/Toshiba.
Fukushima-II-1		1,100	Toshiba.
Takahama-1		780	W/MAPI.
Takahama-2		780	MHI.
Shimane-1		460	Hitachi.
Genkai-1		559	MHI.
Oi-1		1,122	W/MHI.
Oi-2		1,122	W/MHI.
Hamaoka-1		500	Toshiba.
Hamaoka-2		750	Toshiba.
Onagawa-1		500	Toshiba.
Tokai Mura-2		1,100	GE-HITACHI.
Ikata-1		559	MHI.
India:			
Tarapur-1	200		GE.
Tarapur-2	200		GE.
Korea:			
Ko-Ri-1		564	W.
Ko-Ri-2		564	W.
Ko-Ri-3		600	AECL.
Ko-Ri-4		600	AECL.
Philippines:			
Philippine-1		626	W.
Philippine-2		626	W.

U.S.-TYPE NUCLEAR POWERPLANTS ABROAD[1] OPERATING, IN CONSTRUCTION OR ON ORDER, AS OF JUNE 1, 1974 —Continued

[Megawatts electrical]

Country and plant	In operation	In construction or on order	NSSS supplier
Taiwan:			
Chinshan-1		604	GE.
Chinshan-2		604	GE.
Kuosheng-1		800	GE.
Kuosheng-2		800	GE.
Taipower-5		992	W.
Taipower-6		992	W.
Yugoslavia: KRSKO		600	W.

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[1] Abroad refers to non-Soviet bloc foreign countries.
[2] Framatome, of which Westinghouse is important shareholder employs PWR technology.
[3] Industrial group, associated with CGS, which holds GE license for use of BWR technology.
[4] General Electric.
[5] Westinghouse.

NON-U.S.-TYPE NUCLEAR POWERPLANTS ABROAD, OPERATING, IN CONSTRUCTION OR ON ORDER

[Megawatts electrical]

Country and plant	In operation	In construction or on order	NSSS supplier
Argentina:			
Atucha	318		Siemans.
Cordoba		6,600	AECL.
Canada:			
Douglas Point	308		AECL.
Gentilly-1	250		AECL.
Pickering-1	508		AECL.
Pickering-2	508		AECL.
Pickering-3	508		AECL.
Pickering-4	508		AECL.
Pickering-5		750	AECL.
Bruce-1		7,750	AECL.
Bruce-2		750	AECL.
Bruce-3		750	AECL.
Bruce-4		750	AECL.
Gentilly-2		600	AECL.
Gentilly-3		500	AECL.
New Brunswick-1		600	AECL.
Bruce-5		732	AECL.
Bruce-6		732	AECL.
Bruce-7		732	AECL.
Bruce-8		732	AECL.
Pickering-6		508	AECL.
Pickering-7		508	AECL.
Pickering-8		508	AECL.
Czechoslovakia: Bohunice A-1	110		SKODA.
India:			
Rapp-1	200		AECL.
Rapp-2		200	
Italy: Latina	200		TNPG.
Japan: Tokai Mura-1	157		BNDC.
Pakistan: Kanupp	125		CGE.
South Korea:			
Ko-Ri-3		600	AECL.
Ko-Ri-4		600	AECL.
Spain: Vandellos	487		EDF.
France:			
Phenix	250		
Chinon-2	200		
Chinon-3	480		
St. Laurent-1	480		
St. Laurent-2	515		
Bugey-1	540		
Oldbury-1	300		TNPG.
Oldbury-2	300		TNPG.
Winfrith	94		UKAEA.
United Kingdom:			
Calder Hall-1	50		UKAEA.
Calder Hall-2	50		UKAEA.
Calder Hall-3	50		UKAEA.
Calder Hall-4	50		UKAEA.
Chapel Cross-1	50		UKAEA.
Chapel Cross-2	50		UKAEA.
Chapel Cross-3	50		UKAEA.
Chapel Cross-4	50		UKAEA.
Berkeley-1	138		TNPG.

See footnote at end of table.

NON-U.S.-TYPE NUCLEAR POWERPLANTS ABROAD, OPERATING, IN CONSTRUCTION OR ON ORDER—Continued

[Megawatts electrical]

Country and plant	In operation	In construction or on order	NSSS supplier
United Kingdom—Continued			
Berkeley-2	138		TNPG.
Bradwell-1	150		TNPG.
Bradwell-2	150		TNPG.
Hunterston A-1	160		GEC.
Hunterston A-2	160		GEC.
Trawsfynyd-1	250		APC.
Trawsfynyd-2	250		APC.
Hinkley Point A-1	250		EE-BW-TW.
Hinkley Point A-2	250		EE-BW-TW.
Dungeness A-1	275		TNPG.
Dungeness A-2	275		TNPG.
Sizewell A-1	290		EE-BW-TW.
Sizewell A-2	290		EE-BW-TW.
Wylfa-1	590		EE-BW-TW.
Wylfa-2	590		EE-BW-TW.
Windscale	35		UKAEA.
Hinkley Point B-1		625	TNPG.
Hinkley Point B-2		625	TNPG.
PFR		254	UKAEA.
Dungeness B-1		625	APC.
Dingeness B-2		625	APC.
Hunterston B-1		625	GEC.
Hunterston B-2		625	GEC.
Hartlepool-1		625	BNDC.
Hartlepool-2		625	BNDC.
Sizewell B-1		660	EE-BW-TW.
Sizewell B-2		660	EE-BW-TW.
Sizewell B-3		660	EE-BW-TW.
Sizewell B-4		660	EE-BW-TW.
Heysham-1		625	BNDC.
Heysham-2		625	BNDC.
Dungeness C-1		1,300	TNPG.
Dungeness C-2		1,300	TNPG.
Dungeness C-3		1,300	TNPG.

TABLE 1.—CURRENT AND ANTICIPATED FOREIGN ENRICHING PRODUCTION CAPACITY AND SEPARATIVE WORK REQUIREMENTS

[In millions of separative work units]

Country	1974	1979	1981	1983	1985
U.S.S.R.[1]	7-10	7-10	-710	7-10	7-10
Eurodif		3.5	10.5	10.5	10.5
Urenco[2]		.4	2.0	4.0	10.0
United Kingdom/Capenhurst	.4	.4	.4	.4	.4
France/Pierrelatte[3]	.4	.4	.4	.4	.4
South Africa[4]			2.4	8.0	8.0
Canada[4]				8.0	8.0
Japan					.7-.8
Total foreign capacity[5]	7.8	11.7	22.7	38.3	45.0
Total foreign separative work requirements	3.4	13.6	17.8	25.4	33.9
Foreign separative work requirements (excluding Soviet bloc and People's Republic of China)	2.6	10.9	14.0	19.5	25.1

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[1] Capacity data for U.S.S.R. enrichment plant is unpublished; capacity range shown is taken from an unauthenticated and unclassified source.

[2] Includes the United Kingdom, Germany and the Netherlands.

[3] Primarily for military requirements; not economically competitive for commercial power reactor fuel production.

[4] Unlike French-led, Eurodif and Urenco who are each firmly committed to construction of enriching capacity, the South African and Canadian projects are still in the exploratory stages and may not meet the production schedule shown. Hence foreign capacity shown for latter years may be overstated. South African pilot enrichment plant now operating.

[5] Of the amounts shown, the Eurodif capacity is reportedly fully committed with 50 percent to France and 50 percent to Italy, Spain, Belgium, and Japan for delivery 1980-89; for Urenco, approximately 60 percent of planned 1981 production of 2,500,000 separative work units, committed by contract or letter of intent to United Kingdom and German utilities for delivery through mideighties. The U.S.S.R. has recently concluded with non-Soviet-bloc countries a number of enrichment contracts for about 8,500,000 separative work units for delivery through about 1990.

[6] Planned capacity shown does not include that for second Eurodif plant, currently under discussion and scheduled for possible launching late 1975 to early 1976. Europe, Canada, and Australia under consideration as sites for Eurodif II.

TABLE 2.—WORLD URANIUM PRODUCTION

	1969		1970		1971	
	tonnes U	short tons U_3O_8	tonnes U	short tons U_3O_8	tonnes U	short tons U_3O_8
Argentina	42	55	45	60	45	60
Australia	254	330	254	330		
Canada	3, 430	4, 450	3, 530	4, 580	3, 830	4, 980
France	1, 180	1, 530	1, 250	1, 630	1, 250	1, 630
Gabon	500	650	400	520	540	700
Germany	16	21	24	31	18	23
Japan						
Mexico	30	40				
Niger					430	560
Portugal	94	122			81	105
South Africa	3, 080	4, 000	3, 167	4, 117	3, 220	4, 186
Spain	55	72	51	66	60	78
Sweden	29	38	14	18	8	10
United States of America	8, 900	11, 600	9, 900	12, 900	9, 500	12, 300
Total	17, 600	22, 900	18, 650	24, 250	18, 950	24, 630

TABLE 3.—WORLD RESOURCES OF URANIUM

[Tons U_3O_8]

	Reasonably assured	Estimated additional	Total
$10:			
Australia	300, 000	50, 000	350, 000
Canada	240, 000	250, 000	490, 000
South Africa and South West Africa	260, 000	10, 000	270, 000
France, Niger, Gabon, C.A.R	140, 000	70, 000	210, 000
Other [1]	60, 000	60, 000	120, 000
Foreign subtotal	1, 000, 000	440, 000	1, 440, 000
United States [2]	340, 000	700, 000	1, 040, 000
$10 subtotal (rounded)	1, 340, 000	1, 140, 000	2, 480, 000
$10 to $15:			
Australia	80, 000	40, 000	120, 000
Canada	160, 000	280, 000	440, 000
South Africa	80, 000	30, 000	110, 000
Sweden [4]	350, 000	50, 000	400, 000
France, Niger, Gabon, C.A.R	40, 000	50, 000	90, 000
Other	30, 000	60, 000	90, 000
Foreign subtotal	740, 000	510, 000	1, 250, 000
United States [2]	180, 000	300, 000	480, 000
$10 to $15 subtotal	920, 000	810, 000	1, 730, 000
Less than $15 subtotal (rounded)	2, 260, 000	1, 950, 000	4, 210, 000
$15 to $30:[3]			
Canada	100, 000	300, 000	400, 000
South Africa	55, 000	70, 000	125, 000
Sweden [4]	150, 000	200, 000	350. 000
Spain	15, 000	250, 000	265, 000
Other	70, 000	140, 000	210. 000
Foreign subtotal	390, 000	960, 000	1, 350, 000
United States [2]	180, 000	700, 000	880, 000
$15 to $30 subtotal	570, 000	1, 660, 000	2, 230, 000
Grand total (rounded)	2, 830, 000	3, 610, 000	6, 440, 000

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[1] Argentina, Brazil, Denmark, Finland, India, Italy, Japan, Mexico, Portugal, Spain, Turkey, Yugoslavia, Zaire.

[2] Does not include 90,000 tons U_3O_8 by product of phosphate and copper production through year 2000.

[3] ENA/IAEA September 1967.

[4] Expected to be a source of only limited production.

STATUS OF FOREIGN URANIUM ENRICHING SERVICES ACTIVITIES—APR. 1, 1975

1. U.S.S.R.

Customer country: Firm signing contract	Amount (mt SWU)[1]	End use/reactor to be fueled	Delivery date	Comments
A. CONTRACTS WITH THE WEST				
France:				
Commissariat a l'Energie	250	Fessenheim-1	1973–74	
Atomique (CEA)	3,500	Unspecified	1979–83	
Italy: Agip Nucleare	About 4,200	Unspecified	1972–83	
West Germany:				
Rheinisch-Westfalisches	600	Biblis-B	1974–77	
Elektrizitatswerk (RWE)	3,100	Muelheim-Karlich	1978–90	Estimated based on approximate reload requirement for each reactor through 1990 assuming 75 percent powerplant availability and 0.3 percent tails.
Kraftwerk Union	2,600	Iran (2)	1979–80	
Gemeinschaftskernkraftwerk Neckar (GKN)	About 600	Neckarwestheim	1976–80	Option for reloads, 1981–85.
Gesellschaft fur Kernforschung (GFK)		Niederaichbach	NA	Permanent shutdown announced. Disposition of contracted amount not known.
Nuklear-Chemie und-Metallurgie (NUKEM)	1,350	Various	1976–80	
Various	About 500	Grafenrheinfeld, Krummel	1976–77	Option for reloads, dates not available.
Belgium: Synatom	1,300	Doel-3, Tihange-2	1979–85	
Sweden: Svens Kernbransleforsorjning	300	Unspecified	1979	Option for 1,100 mtSWU for delivery 1980–89.
Finland: Teollisuuden Voima Oy (TVO)	300	Olkiluoto-1	1977–79	Option for 350 mtSWU for delivery 1980–85.
Spain: Empresa Nacional del Uranio (Enusa)	5,100	Unspecified	1978–90	
Austria: Gemeinschaftskernkraftwerk Stein	1,260	Stein	1978; 1980–89	
United Kingdom: CEGB	1,000	Various	1980–89	Partial reload requirements for 2 SGHWR's.

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[1] Separative work unit. This is the unit of measurement of uranium enrichment production.

Customer country: Buyer/user	Amount (mt SWU)	End use/reactor to be fueled	Delivery date	Comments
B. POTENTIAL COMMITMENTS				
Japan: NA	1,000/yr	NA	1976–2000	U.S.S.R. has offered at least 1,000 mtSWU annually beginning in 1976 and repottedly would prefer to supply 3 to 4 times that much.
United States: General Electric	100 3,500	Foreign reactors not specified	1974 1974–94	Authorized to conclude contract with U.S.S.R. but no action taken.
Switzerland: NA	NA	NA	NA	Reports of talks in 1973 concerning Soviet provision of enrichment services. No firm date.
West Germany: KWU	NA	Proposed Kaliningrad reactor		Reportedly, KWU to purchase natural uranium on free world market with toll enrichment in U.S.S.R.

2. EURCDIF (FRANCE)[1]

Customer country: Firm signing contract	Amount (mt SWU)[1]	End use/reactor to be fueled	Delivery date	Comments
A. REPORTED AGREEMENTS/CONTRACTS				
Japan: Federation of electrical power companies representing 9 utilities.	1,000 yr	To be shared by 9 utilities	1980–89	Agreement signed Jan. 26, 1974, contract signed June 27, 1974
Spain: NA	400	NA	1979	Spain reportedly has given Eurodif a letter of intent for these amounts which total 3,900 mtSWU.
	500		1980	
	600		1981	
	700		1982	
	800		1983	
	900		1984	
Switzerland: NA	200 or 1,000	Kaiseraugst	1977–89	Contract figures of 200 and 1,000 mtSWU reported. One source indicates France's CEA will supply enrichment for the first core and first 2 reloads for delivery 1977 through 1979 with Eurodif supplying the subsequent nine reloads through 1989.
West Germany: RWE, EVS	300	2 reactors currently under construction.	1981	These 2 utilities have placed orders with Eurodif.
	120		1982	
	120		1983	
	120		1984	

Customer country: Buyer/user	Amount (mtSWU)	End use/reactor to be fueled	Delivery date	Comments
B. POTENTIAL COMMITMENTS				
Belgium: NA	800/yr	NA	Post 1980	Annual order expected to be around 800 mtSWU. No firm contracts.
France: EdF	3,000/yr	NA	NA	Unconfirmed report that EdF has placed an order for this amount annually for 10 years. No firm data on contract. Estimates of EdF's requirements from Euridof amount to 4,500/yr.
Iran: NA	NA	French-supplied reactors	NA	Under terms of recent Franco-Iranian agreement, Iran will have an option to receive 10% of Eurodif's production.
Italy: CNEN, AGIP	800/yr	NA	1981–82	Italy's estimated requirements from Eurodif. It has been reported that Eurodif has requested Italy to accept first delivery in 1979—2 years in advance of that given in the estimate.
	1,600/yr	NA	1983	
	2,000/yr	NA	1984–88	
	2,400/yr	NA	1989–90	

3. URENCO (UNITED KINGDOM-NETHERLANDS-FEDERAL REPUBLIC OF GERMANY)[2]

Customer country: Firm signing contract	Amount (mt SWU)[1]	End use/reactor to be fueled	Delivery date	Comments
A. REPORTED AGREEMENTS				
West Germany, United Kingdom: 5 utilities	270	NA	1977	5 utilities in West Germany and the United Kingdom have signed letters of intent for these amounts.
	340		1978	
	750		1979	
	1,250		1980	
West Germany, Netherlands: 6 utilities	750	NA	1980	Negotiations with 6 other utilities for orders expected to bring the total to over 2,000 mtSWU for delivery in 1980.
Switzerland: NA	NA	NA	NA	Reported to have placed an order with URENCO.

Customer country: Buyer/user	Amount (mtSWU)	End use/reactor to be fueled	Delivery date	Comments
B. POTENTIAL COMMITMENTS				
France: Electricité de France	NA	NA	NA	Unconfirmed reports in April 1974 that EdF planned to discuss a contract with URENCO. No further data.
Japan: NA	NA	NA	NA	Reported discussions negotiations for post-1980 supply.
Spain: ENUSA	NA	NA	NA	Discussions with URENCO as part of Spain's plans to diversify source of supply.

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[1] Eurodif's production has been reported as already sold for a 12-yr period. However, not all contracts and amounts of separative work are known.

[2] Data pertaining to URENCO sales are conflicting and generally not verified. Most reports indicate commitments of about 2,000 mtSWU for delivery in 1980; figures for total orders covering 10-yr contracts range from 9,000 to 20,000 mtSWU.

NA—Not available.

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